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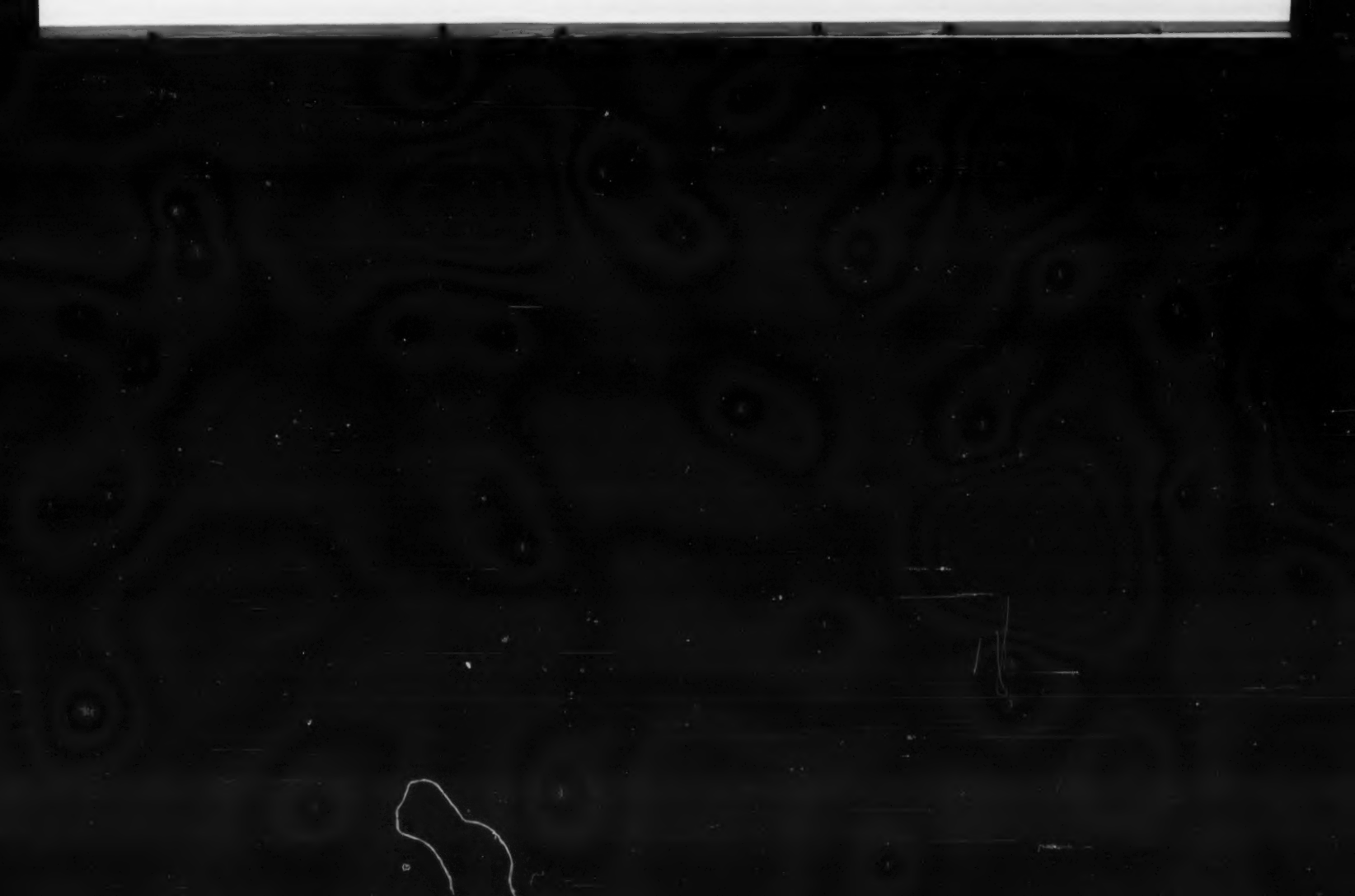

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A METHOD OF STUDYING WILD BIRD POPULATIONS BY MIST-NETTING AND BANDING

By DONALD D. STAMM, DAVID E. DAVIS and CHANDLER S. ROBBINS

INTRODUCTION

A method of estimating avian populations is essential for clarifying the ecology of arthropod-borne viruses in wild birds. The activity of such viruses is being investigated by capturing birds in nets, banding and taking a blood sample, then recapturing a proportion of them later. A technique for estimating population densities incorporated into such studies will increase their value greatly. Such a technique also will be useful in general ornithological studies and in the evaluation of the effects of pest-control measures on birds. For these purposes, a method of population estimation should provide estimates for a maximum number of species and of individuals, birds of all ages and both sexes, breeders and nonbreeders; it should be applicable in all sorts of environments, in all seasons, and allow statistical evaluation of the dependability of data.

Quantitative studies on breeding populations of small wild birds have been of two types. First, the trapping and marking of a large proportion of a population of one or a few species, with detailed observation of individual birds over a long period (Kendeigh, 1934-44; Nice, 1937; Kluijver, 1951; Farner, 1955). Second, the estimation of breeding-bird populations by the Williams (1936) spot-mapping technique (*Aud. Field Notes*, 1950) which is based largely on territorial males. These methods have produced much useful and interesting information but also have emphasized the need for techniques more closely approaching the ideal outlined above. Recently, the introduction of the Japanese mist net has made available a highly nonselective method for taking larger numbers of a wider variety of species than by any other method in use (Austin, 1947; Low, 1957).

This paper reports progress toward development of a method of estimating numbers of small wild birds by combining mist-netting and banding, then calculating the population on the basis of recapture. Results obtained by this method are compared with those from a concurrent breeding-bird census made by the Williams spot-mapping method. The netting method was found to be practical for most species present and to yield results within useful statistical limits. The estimates obtained are, of course, based on the assumptions inherent in the recapture method.

LOCATION OF STUDY

The study was conducted at the Patuxent Wildlife Research Center near Laurel, Maryland. This area has been surveyed and permanent markers placed 330 feet apart on a grid. Nets were placed in a heavily-wooded deciduous forest, in and immediately adjacent to the flood plain of the Patuxent River in the Western Shore Section of the Oak-Pine Forest Region of Maryland (Stewart & Robbins, 1958), elevation is 95 to 105 feet. The study tract is surrounded by similar habitats for at least 4 miles upstream (NW), 4 miles downstream (SE), 400 yards to the northeast, and 150 to 350 yards to the southwest. Percentage distribution of the net locations by habitats (as described by Hotchkiss and Stewart, 1947) was 45% Terrace Forest (Beech, White Oak), 14% Bottomland Forest (Beech, Tulip-tree, Northern Red Oak [*Q. borealis*], Sweetgum), 14% River Swamp (Pin Oak, Overcup Oak [*Q. lyrata*], Red Maple, Sweetgum, Red Ash), 10% Transition Swamp, 7% Shrub Swamp, 5% Seepage Swamp, 2% Second Growth Swamp, and 2% Upland Oak Forest.

MATERIALS AND METHODS

Netting method.—Imported Japanese mist nets made of nylon (obtained from the Northeastern Bird-Banding Association, designated Type A: 4-shelf, 12-meter) were stretched between bamboo poles braced by 60-pound-test green linen fishline.

Nets were placed at 200-foot intervals along two 2000-foot lines that intersected at right angles at their midpoints. This arrangement was chosen because it represented about the maximum distance one person could walk, process the birds, and visit each net at least once every 2 hours. Within these limitations, this pattern offers the best sampling of habitat, intersects a maximum number of territories, and allows maximum detection of bird movement. The 200-foot interval was chosen on the basis of previous use of nets in woodland, where recaptures usually were made 400 to 600 feet apart. Thus, this interval should place two or three nets within the range of each bird. To set out the nets, survey lines were first located and flags placed at grid markers. Trails then were cleared. Net locations were determined by use of a 100-foot rope and a compass.

On March 31, 1959, 18 nets were placed parallel to the survey lines in the pattern described. Initially, no net was placed at the center position or at the first positions north and south of the center. On April 20, three nets were placed perpendicularly across the survey lines in these positions, and this arrangement was used through May 26. On June 3, each net was moved 100 feet south and 100 feet west to newly prepared lines and all of the nets were placed perpendicularly across the lines. These locations were used from June 4 through June 9. Ten nets that were somewhat damaged were replaced by new or slightly used ones when the arrangement was moved on June 3. All of the nets that were in place for the entire interval of 72 days were still in good condition at the end of this period.

During the last round of each day the nets were taken out of operation by slipping the end loops of each together at the middle of the poles and relaxing the bracing cords on one pole. When there were intervals

of one day or longer between netting, the mesh was fastened around the gathered shelf strings with pieces of cord by making ties at the center and about 6 feet from either end; loose mesh between ties was then wound around the shelf strings. When nets were used daily, the mesh of the net was not tied with cords but was wrapped around the shelf strings by a cranking motion from one end of the net after it had been slackened.

During active operation of the nets, all birds were first removed as rapidly as possible and placed in black cloth bags. (These bags are about 12 x 15 inches in size and are held flat and close by a corset stay sewed into each side 3 inches from the open end.) Five of these bags were carried while netting. Individuals of hard-biting and fighting species were placed in individual bags. Up to 5 birds of other small species were held satisfactorily in a single bag for short periods. Birds were identified, banded (if new), checked for brood patches, measured, released, and their net locations recorded, all within a few minutes of removal from the net.

The method used to estimate the population on the basis of recapture (Peterson, 1896) is based on the following reasoning. If a number of birds are banded and released, then the reciprocal of the proportion of banded birds in a subsequent sample times the number marked originally gives an estimate of the original population. This relationship is expressed in the formula:

$$N = \frac{Mn}{m}$$

N = the estimated number of birds present *during the marking period.*
M = the number of birds banded and released during the marking period.
n = the total number of birds captured during the sampling period.
m = the number of birds captured during the sampling period that were captured and released banded during the marking period.

The standard error of N is calculated from the formula:

$$\text{S. E.} = \sqrt{\frac{(M)^2 n\ (n-m)}{(m)^3}}$$

(Bailey 1951)

Population estimates made by this method are based on the following assumptions:

1. No loss or gain of marks.
2. No difference in mortality of marked and unmarked individuals.
3. Random distribution of marked and unmarked individuals or random sampling.
4. No recruitment, no difference in departures of marked and unmarked.
5. Behavior and catchability the same in marked and unmarked.

Assumptions 1, 2, and 3 probably are valid for the period of this study or at least the variations are inconsequential. However, information obtained shows that assumptions 4 and 5 are not valid in this study. Recruitment and net-shyness both tend to inflate population estimates and clearly do so in this study.

Spot-mapping Method.—Estimate of populations by the spot-mapping

procedure followed the Williams method, described in *Audubon Field Notes* (1950). The area in which the census was made lay within a square, 2,310 feet on each side, centered at the middle net. Instead of including the entire square of 122½ acres, an area of 22½ acres (990 x 990 feet) was omitted from the northeast corner and a strip containing 10 acres (330 x 1320) was omitted from the north edge. On the remaining 90 acres, previously surveyed lines running north-south and east-west at intervals of 330 feet were cleared, and marked with white tags. The area was censused by walking along these cleared trails on the following dates: May 21, 23, 26 (2 trips), 28, 30, and June 4, 6, 9, 1959. Trips started between 4:12 and 4:55 a.m. and ended between 8:00 and 9:35 a.m., except for one late morning trip from 9:05 to 11:40 a.m. The mean time per trip was 4 hours and 10 minutes.

During each census trip all birds seen or heard within 165 feet (half the distance between trails) of the census trails were plotted on a field map. Approximate positions of birds heard at greater distances also were mapped, and these positions were corrected later if the birds subsequently were heard closer to one of the other census lines. Symbols were used to designate sex, if known, and to indicate the positions of two birds of the same species that were heard singing simultaneously. At the conclusion of each day's trip, all records from the field sheets were transferred to separate sheets for each species. A different color was used on the species sheets for each day's records. Birds seen in the mist nets during the census trips were not mapped or included in the spot-mapping census in any way. Although a few records of singing birds were lost as a result of simultaneous netting operations, it was believed that inclusion of the netting data would distort the census figures considerably more than would omission of the netting data. Records from previous days were never taken into the field during census trips, as such a practice could have influenced the observer in his determination of positions.

After data from the nine field trips had been transcribed onto species sheets, it was assumed that clusters of spots of a given species color represented occurrences of a single male of that species on his singing territory. Thus approximate territories were sketched on the sheets on the basis of the clusters of records, and more especially from notations regarding different individuals heard singing simultaneously.

The number of territories in the 90-acre study area was obtained by adding to the number of territories that lay entirely within the 90 acres the fractional portions of those territories that lay only partly within the area. The number of territories per 100 acres was obtained by dividing the number per 90 acres by 0.90 and rounding off the quotient to the nearest whole number. The resulting number was multiplied by 2 to convert singing males to total individuals; this, of course, was done on the assumption that there were equal numbers of males and females in the area.

Estimates of the population by each method were made without knowledge of results by the other method.

Operation of nets.—Nets were operated on 23 days from March 31 through June 9, 1959. Eighteen nets were used on April 2, 4, and 6, and 21 nets on all subsequent days. The opening round was begun

at 7:00 a.m. on all days except April 2 (9:30), 21 (9:00), May 9 (6:00) and 16 (7:30). The closing round, although irregular through April 23, was started at 4:30 p.m. from April 25 through May 21 (except (5:00 on May 5 and 6:00 on May 9), and at 5:00 for the remainder of the study. Nets were visited at approximately 1½-hour intervals through May 21, and at exactly 2-hour intervals from May 23 though June 9. During a total of 4200 net-hours of operation 966 captures were made, yielding an average rate of 23.0 captures per 100 net-hours.

DESCRIPTION OF VEGETATION IN TERMS OF TREE COMPOSITION

Habitat.—The habitats in which these studies were conducted require description in terms that permit ready comparison with other areas in order that bird populations may be compared. Although plant ecologists have developed many methods of describing vegetation, the simplified scheme that was used requires only meager botanical knowledge and very little time. The essence of the procedure was to list the size and frequency of trees near each net by systematic sampling. The trees give a clear picture of the general aspect of the vegetation and can serve as a basis for comparison with other areas.

The trees to be measured were selected as follows. The first step was to place a 100-foot rope on the ground in line with the net and extending out from the east (or south) pole. The observer then stood at this pole facing east (or south) and selected the nearest tree that was within a quarter circle on each side of the rope. Thus he was choosing a tree within a half circle whose base was perpendicular to the direction of the

TABLE 1. Species of trees adjacent to nets

	Circumference in inches							
	4 or less	5-14	15-24	25-49	50+	Total trees	% of 525 trees	Present at % of nets
Pinus echinata (Shortleaf Pine)	—	—	—	1	—	1	—	4.8
Carya glabra (Pignut)	1	—	—	1	—	2	—	9.5
Carpinus caroliniana (Hornbeam)	93	14	1	—	—	108	20.6	66.6
Betula nigra (River Birch)	2	—	—	—	—	2	—	9.5
Alnus rugosa (Alder)	17	—	—	—	—	17	3.2	33.3
Fagus grandifolia (Beech)	58	14	5	9	1	87	16.6	76.0
Quercus alba (White Oak)	10	9	4	3	2	28	5.4	52.0
Quercus bicolor (Swamp White Oak)	—	—	1	—	—	1	—	4.8
Quercus palustris (Pin Oak)	—	4	2	3	2	11	2.1	33.3
Quercus phellos (Willow Oak)	—	3	1	2	—	6	1.0	19.0
Quercus velutina (Black Oak)	2	—	—	—	1	3	—	14.3
Ulmus sp. (Slippery Elm)	4	1	—	—	—	5	1.0	4.8
Magnolia virginiana (Sweetbay)	5	—	—	—	—	5	1.0	9.5
Liriodendron tulipifera (Tulip-tree)	1	1	—	1	—	3	—	9.5
Sassafras albidum (Sassafras)	3	—	—	—	—	3	—	9.5
Liquidambar styraciflua (Sweetgum)	30	13	13	22	2	80	15.3	81.0
Ilex opaca (Holly)	3	1	—	—	—	4	—	14.3
Acer rubrum (Red Maple)	29	23	22	8	1	83	15.8	76.0
Cornus florida (Flowering Dogwood)	14	2	1	—	—	17	3.2	14.3
Nyssa sylvatica (Blackgum)	12	14	9	6	—	43	8.2	66.6
Fraxinus pennsylvanica (Red Ash)	12	3	—	—	—	15	2.8	14.3

net. After this tree was measured a second was chosen by the same procedure using the tree rather than the pole as a base. Then subsequent trees were chosen until 25 had been measured at each net. Care was exercised to keep the base of the half circle perpendicular to the rope and so avoid "back-tracking."

Several arbitrary rules were observed. The trees were measured at breast height. All trees that had attained breast height were included. If multiple trees were separated at the base, each was counted as an individual. Shrubs were omitted even though some were more than breast high. Bent trees were included if the base was within the area.

The data for each net were recorded on individual sheets and then summarized (Table 1). Nomenclature follows Hotchkiss and Stewart, 1947. The relative importance of each species is indicated in two ways: the percentage of total trees and the percentage of net locations having at least one of each species. These two calculations give a clear impression of the habitat. The forest is just reaching maturity (many Beeches but few very large ones), has a definite understory (Hornbeam, Beech, Flowering Dogwood), is primarily a moist area (Red Maple, Willow Oak, Sweetgum) but has some dry parts (pines, Black Oak).

RESULTS

A summary of daily captures, net-hours of operation, and captures per 100 net-hours is given in Tables 2 and 3. From March 31 through April 25 most of the birds captured were either winter residents or

TABLE 2. Summary of captures of breeding species 1 through 29*

Date 1959		Adult				Immature		Total
		New birds banded & released	Repeat from previous days	Repeat same day	Died (D) or Escaped (E) not banded	New birds banded & released	Repeat from previous days	
March	31	4	—	—	—	—	—	4
April	4	6	—	—	—	—	—	6
	6	4	1	—	—	—	—	5
	21	10	2	—	—	—	—	12
	23	3	1	—	—	—	—	4
	25	1	—	—	—	—	—	1
May	5	52	—	5	1D	—	—	58
	7	37	13	1	—	—	—	51
	9	41	13	2	—	—	—	56
	12	33	15	3	—	—	—	51
	14	26	16	1	1D	—	—	44
	16	20	21	1	1D	—	—	43
	19	36	16	1	2E	—	—	55
	21	33	20	2	1E	—	—	56
	23	16	16	2	1E	—	—	35
	26	21	15	2	—	—	—	38
June	4	31	30	4	—	—	—	65
	5	16	26	3	—	5	—	50
	6	10	28	2	—	1	—	41
	7	10	26	1	—	3	1	41
	8	10	10	1	—	1	1	23
	9	11	16	2	—	1	—	30
Total		431	285	33	7	11	2	769

*Listed in Table 5

permanent residents. Only 3 summer residents were banded during this period: A Louisiana Waterthrush* was taken on April 4, a Black-and-white Warbler on April 21, and a Blue-gray Gnatcatcher on April 23; all of these individuals were recaptured during May. As compared with May, the rate of capture during April was low and showed a sharp decrease on the 23rd and 25th. This trend reflects the lower density of the winter and early spring population and the departure of most winter-resident birds before the arrival of large numbers of summer-resident birds that had wintered farther south. Summer-resident breeding species apparently arrived in large numbers between April 25 and May 5.

The proportion of recaptured birds to new birds in daily totals tended to increase as more birds were banded. Immature birds were taken first on June 5 and they constituted 7 per cent of the captures from June 5 through June 9.

Eight birds were killed during the actual netting procedure, amounting to 0.8 per cent of captures. Also, four birds died when they became

TABLE 3. Summary of captures

	Winter Resident and Transient Species*					All Species		
Date 1959	New birds banded & released	Repeat from previous days	Repeat same day	Died (D) or Escaped (E) not banded	Total non-breeders	Total captures	Net-hours	Captures per 100 net-hours
March 31	47	—	—	1D	48	52	**	—
April 2	1	—	—	—	1	1	**	—
4	9	1	—	—	10	16	153	10
6	31	1	—	—	32	37	180	21
21	6	—	—	—	6	18	147	12
23	4	—	—	—	4	8	189	4
25	1	1	—	—	2	3	200	2
May 5	9	—	—	—	9	67	210	32
7	8	—	—	—	8	59	200	30
9	9	2	1	—	12	68	252	27
12	7	1	—	—	8	59	200	30
14	10	—	—	—	10	54	200	27
16	14	1	—	—	15	58	189	31
19	11	1	—	2E	14	69	200	35
21	6	—	—	—	6	62	200	31
23	7	—	—	—	7	42	210	20
26	3	—	—	1D	4	42	210	20
June 4	—	—	—	—	—	65	210	31
5	—	—	—	—	—	50	210	24
6	—	—	—	—	—	41	210	20
7	—	—	—	—	—	41	210	20
8	1	—	—	—	1	24	210	11
9	—	—	—	—	—	30	210	14
Total	184	8	1	4	197	966	4200	23

* Plus 1 Robin on May 12 and 1 Woodcock on June 8.
See Table 4 for list of winter residents and transients.
**Irregular operation; nets being placed.

*The names of bird species included in this paper follow the "Check-List of North American Birds" (5th ed.) prepared by a committee of the American Ornithologists' Union, 1957.

entangled in improperly tied nets between netting periods and this raised total mortality to 1.2 per cent of captures.

A summary of captures of non-breeding species is given in Table 4. Only 6 of 99, or 6 per cent, of the individuals of transient species were recaptured the next day or later, as compared to 38 per cent of adults of breeding species.

Data on 29 breeding species, including recaptures, movement, and a comparison of population estimates made by the recapture method and the spot-mapping technique are summarized in Table 5. Species are numbered to facilitate discussion of findings for various groups. Three breeding species (species 30, 31, 32) included in the spot-map census were not banded. (Two Ruby-throated Hummingbirds were captured in nets but released unbanded; no Barred Owls or Common Crows were taken in the nets.) Surprisingly few transient individuals of breeding species were captured; in fact, the American Goldfinch was the only breeding species for which transients are known to have been banded. Seventeen goldfinches banded on March 31 and 3 others banded on or before May 7 were assumed to be transients and were omitted from the breeding bird calculations. Also omitted were one American Woodcock and one Robin that were present in the area as post-breeding wanderers.

Species 1 through 32 are divided into two groups for population estimation. The first group (species 1 through 16) includes 16 species of which 25 per cent or more individuals were recaptured; this group includes 85 per cent of all individuals of the 29 species banded. The second group (species 17 through 32) includes 13 banded species of

TABLE 4. Adults of winter-resident and transient species taken between March 31, and May 26, 1959

Species	Number banded and released	Number recaptured next day or later
Winter-resident species		
Yellow-shafted Flicker	3	
Brown Creeper	3	
Rusty Blackbird	1	
Slate-colored Junco	59	1
White-throated Sparrow	17	1
Total 5	83	2
Transient species		
Great Crested Flycatcher	1	
Catbird	1	
Swainson's Thrush	26	1
Gray-cheeked Thrush	12	1
Veery	3	
White-eyed Vireo	1	
Tennessee Warbler	1	
Magnolia Warbler	1	
Black-throated Blue Warbler	2	
Chestnut-sided Warbler	1	
Northern Waterthrush	16	3
Canada Warbler	8	
Indigo Bunting	3	
American Goldfinch (part)	20	
Swamp Sparrow	3	1
Total 15	99	6

which fewer than 25 per cent of the individuals were recaptured; this group includes 15 per cent of all individuals of the 29 species. In general, the species recaptured least frequently were those with the fewest individuals present, those having large ranges, or very small species (gnatcatchers), which the nets are least efficient in capturing. Recaptures for each species are listed only for the period May 5 through June 9, and captures made during this period are used in calculating distances between recaptures and in making population estimates. Earlier captures are excluded because differences probably exist in the amount of movement before and after birds are settled in breeding territories. A total of 301 recaptures of 165 birds of 20 species was made during this period.

Distances between recaptures were measured on a scale map of the netting arrangement. The "mean-maximum recapture distance" for each species was determined by measuring the greatest distance between recaptures for each individual of the species and averaging these distances. Birds recaptured only in the same net were not included in this calculation. For the 20 species concerned, mean-maximum recapture distances varied from 200 to 870 feet with an average of 550 feet. It should be noted that many of these recapture distances are based on only a few birds and a few recaptures, and all were influenced by the arrangement of the nets. The figures listed are, therefore, by no means definitive for the species.

Figures are listed for the probable number of birds in the area covered by the nets on the basis of the spot-map census. The numbers in the "available birds" column were obtained by determining on spot maps the number of birds whose territories fell in part within the species' mean-maximum recapture distance from the nets.

The recapture population estimates in Table 5 were calculated from two 6-day netting periods and are an average of 7 different estimates for these periods. The method of calculation and reasons for using these figures will be discussed later. Estimates are given for the Red-eyed Vireo and Wood Thrush and for the totals of species 1 through 16 and of species 1 through 29. The estimate for species 1 through 16 is given separately because 25 per cent or more of individuals of these species were recaptured and the standard error of the estimates on these species is, therefore, much smaller than that for all 29 species. Recapture estimates for the two groups of species and for the Red-eyed Vireo are higher than, but very close to, the figures obtained by the spot-map census. The recapture estimate of the Wood Thrush population, however, is nearly double the spot-map figure. According to the spot-map census, 86 Red-eyed Vireos and 42 Wood Thrushes were estimated to be available; the numbers of these species banded were 92 and 72, respectively. The proportion of number banded to number available for other species is generally what would be expected on the basis of the proportion of banded birds in daily captures (see Table 8).

Estimates of the population based on the recapture method discussed in the Materials and Methods section are presented in Tables 6 and 7. No estimates are made of the population present before May 5 because effort and catches were small before that date. Population estimates are given for all breeding species (Table 5, species 1 through 29); for those

TABLE 5. Summary of banding, recaptures, movement, and population estimates of breeding birds

Species number	Species	Number banded	Number recaptured	Number of recaptures*	Maximum distance between captures in feet	Mean-maximum recapture distance in feet	Available birds	Birds per 100 acres spot-map	Population estimates by recapture
1	Red-eyed Vireo	93	43	80	810	337	86	100	108
2	Acadian Flycatcher	26	9	13	870	330	40	50	
3	Wood Thrush	72	32	75	1200	501	42	41	85
4	Hooded Warbler	24	11	34	1600	573	32	38	
5	Scarlet Tanager	25	8	11	900	530	36	31	
6	Ovenbird	20	9	18	860	497	30	29	
7	Tufted Titmouse	26	13	17	1180	648	30	22	
8	Kentucky Warbler	19	8	15	1070	660	32	22	
9	Red-bellied Woodpecker	10	5	7	1140	463	20	19	
10	Downy Woodpecker	19	8	11	710	570	20	18	
11	Cardinal	12	5	6	900	460	16	16	
12	Louisiana Waterthrush	6	5	8	1110	753	14	9	
13	Eastern Wood Pewee	3	1	1	600	600		8	
14	Black-and-white Warbler	2	1	0	—	—		7	
15	White-breasted Nuthatch	6	2	1	700	700		4	
16	Rufous-sided Towhee	4	1	1	500	500		2	
1 through 16		367	161	298				416	435
17	American Redstart	10	1	1	200	200		18	
18	Blue-gray Gnatcatcher	6	1	0	—	—		17	
19	Carolina Chickadee	12	1	1	710	710		9	
20	Hairy Woodpecker	11	1	1	870	870		7	
21	Brown-headed Cowbird	4						9	
22	Parula Warbler	1						7	
23	Yellowthroat	2						7	
24	American Goldfinch (part)	4						7	
25	Blue Jay	6						6	
26	Yellow-throated Vireo	5						4	
27	Pileated Woodpecker	1						3	
28	Red-shouldered Hawk	1						2	
29	Mourning Dove	1						1	
1 through 29		431	165	301				513	528
30	Ruby-throated Hummingbird	0						4	
31	Barred Owl	0						2	
32	Common Crow	0						2	
1 through 32		431	165	301				521	

*Recaptures are listed only for the period May 5 through June 9. This explains why "Number of Recaptures" is less than "Number Recaptured" for species 14, 15, and 18.

Recaptured" for species 14, 15, and 18.

TABLE 6. Estimates of breeding population on the basis of recaptures

Marking period	Sampling period	Species 1 through 16*					Species 1 through 29*				
		M	n	m	N	S.E.	M	n	m	N	S.E.
May 5, 7, 9	May 12, 14, 16	123	102	27	465	76	134	114	27	566	95
"	May 19, 21, 23	123	112	24	574	104	134	128	24	715	122
"	June 4, 5, 6	122	116	39	363	47	133	128	39	437	58
"	June 7, 8, 9	122	74	21	430	80	133	78	21	494	92
May 12, 14, 16	May 19, 21, 23	100	112	21	543	105	112	128	21	683	136
"	June 4, 5, 6	99	116	27	442	76	111	128	26	546	96
"	June 7, 8, 9	99	74	13	556	142	111	78	13	666	169
May 19, 21, 23	June 4, 5, 6	108	116	25	501	89	124	128	27	588	100
"	June 7, 8, 9	108	74	10	799	233	124	78	10	967	286
June 4, 5, 6	"	115	74	28	304	45	127	78	29	342	50
June 7, 8, 9	None	54					58				
May 5-16	June 4-9	194	162	65	484	46	217	177	65	591	58
May 14-26	"	180	162	55	530	58	209	177	57	649	71

* See Table 5 for relation of species numbers to species

TABLE 7. Estimates of Red-eyed Vireo and Wood Thrush populations on the basis of recaptures

Marking period	Sampling period	Red-eyed Vireo					Wood Thrush				
		M	n	m	N	S.E.	M	n	m	N	S.E.
May 5, 7, 9	May 12, 14, 16	30	36	10	108	29	31	14	6	72	22
"	May 19, 21, 23	30	23	4	173	79	31	24	8	93	38
"	June 4, 5, 6	30	31	11	85	20	30	18	7	77	23
"	June 7, 8, 9	30	20	8	75	21	30	20	4	150	67
May 12, 14, 16	May 19, 21, 23	34	23	8	98	28	14	24	4	84	38
"	June 4, 5, 6	34	31	8	141	40	14	18	4	63	26
"	June 7, 8, 9	34	20	5	136	53	14	20	3	93	50
May 19, 21, 23	June 4, 5, 6	23	31	5	143	58	23	18	5	83	31
"	June 7, 8, 9	23	20	1	460	450	23	20	4	115	51
June 4, 5, 6	"	31	20	7	89	27	18	20	10	36	8
June 7, 8, 9	None	20					20				
May 5-16	June 4-9	54	44	19	125	22	38	28	10	106	27
May 14, 26	"	45	44	15	132	28	33	28	8	116	35

species of which 25 per cent or more individuals were recaptured (Table 5, species 1 through 16); and for the Red-eyed Vireo and Wood Thrush, the two species captured in greatest numbers. Twelve different estimates are presented in Tables 6 and 7 to illustrate variations in estimates when different periods of time are employed in the calculations. These separate estimates also demonstrate the degree of consistency in trends observed in all breeding species and in three components of this total.

The percentage of unbanded birds in the totals captured on successive days is shown in Table 8 for species 1 through 16, and for Red-eyed Vireos and Wood Thrushes.

DISCUSSION

In this study the most obvious sources of error in recapture population estimates are recruitment and net-shyness. For adult birds of species breeding in the season and locale of this study, there are three sources of recruitment. First, the arrival of new individuals that establish breeding territories, mainly in the beginning of the breeding season; second, later arrival of individuals that are unable to establish breeding territories and constitute a surplus population which presumably moves randomly about the area; and third, transient individuals. The data gathered in this study allow a number of approaches to assessing recruitment; observation of trends in daily rate of capture (Table 3), trends in recapture population estimates, and in the various factors that enter into the formula when successive periods of time are employed in calculations (Tables 6 and 7), variations in these trends between individuals species and groups, and trends in the percentage of unmarked birds in daily totals (Table 8). Net-shyness is expected to be manifest in a progressive decline in catch per effort and to be reversed and again show its effect when nets are moved. Trends in observations would be expected to display the effects of an interplay of

TABLE 8. Per cent of unbanded birds in totals captured on successive days

Date 1959	Species 1 through 16*		Red-eyed Vireo		Wood Thrush	
	Total	% Unbanded	Total	% Unbanded	Total	% Unbanded
May 5	51	100	6	100	16	100
7	46	78	11	91	16	69
9	46	74	17	82	6	67
12	40	70	18	67	5	60
14	38	63	9	44	6	50
16	38	45	16	50	5	40
19	39	64	13	62	8	63
21	50	60	13	46	9	67
23	32	50	4	0	8	50
26	28	46	7	57	7	43
June 4	56	48	14	43	11	45
5	36	31	10	60	9	33
6	35	20	9	33	3	0
7	35	26	12	17	6	17
8	17	41	3	33	7	43
9	27	41	6	50	9	33

* See Table 5 for relation of species numbers to species

recruitment and net-shyness. For example, the increase in rate-of-capture on May 19 (Table 3) was probably the result of a wave of migration. This conclusion is supported by independent observation—"North of Washington there was a mild wave on April 26, another on May 4 and 5, and the most pronounced on May 18 and 19." (Scott, 1959.) The trend of decrease in rate-of-capture on May 19th through 23rd and June 4th through 8th was probably the result of the development of net-shyness and was interrupted by relocation of the nets.

Further evidence of recruitment and net-shyness can be deduced from trends in the various factors entering into the recapture population estimates (Tables 6 and 7). The value of M for successive marking periods tends to decrease except for the period including May 19, when the wave of migration occurred. The decreasing trend is most marked when the period May 19, 21, 23 is compared with June 7, 8, 9. The value of m and its proportion to n for a given sampling period generally become smaller when used with successively later marking periods until the nets were moved; they then show a sharp increase. The population estimate (N) and its standard error (S.E.) increase sharply at the time when heavy recruitment by migration into the area is known to have occurred, progressively increase as net-shyness would be expected to exert its influence, and decrease when the nets were moved.

If all of the assumptions involved in the recapture method of population estimation (listed in the Materials and Methods section) were valid, the percentage of unbanded birds in the totals captured on successive days (Table 8) would show a steady decline. Such a trend is observed from May 5 through May 16; this trend is reversed on May 19. This observation is consistent with the expected effect of the arrival of a substantial number of new birds in the area on May 19 and independent evidence that this did occur has been cited. A trend toward reduction in the per cent of unbanded birds again appears after May 21 but a reversal is noted in all groups between June 7 and 8. The failure of this trend to continue is probably due to net-shyness.

It is realized that a cause and effect relationship has not been established between recruitment and net-shyness and the trends observed. A great deal more detailed study will be necessary to accomplish this. However, if further work validates the conclusions, it should be possible to develop mathematical manipulations to remove the effects of these two sources of error (Parker, 1955). Estimates for groups of species are complicated by assuming (as was done in calculations in this paper) that all species are similar in respect to the assumptions listed in the Materials and Methods section. Data presented here indicate that species are not similar in these respects. Further complications will arise in comparing studies in different areas because the proportions of the various species present will differ.

The locality in which this study was conducted offered a number of advantages that will be difficult to achieve in other areas. No interference was experienced from humans or domestic animals, no net was exposed to wind, and only one was exposed to direct sunlight. In areas where conditions are less favorable, the 2-hour interval between visits to nets would not be feasible. During the course of this investigation the weather was phenomenally good. Each day of operation

used in the recapture-population estimates was so much like every other one that weather variation is not believed to have biased the netting results. Erratic weather conditions and their possible effect on activity of birds and effectiveness of nets may be expected to complicate interpretation of data in the future.

The main contribution of this study is its illustration that a combination of mist-netting and banding with a definite pattern of arrangement and schedule of operation will produce information on bird populations not obtainable by other techniques. It produces a mass of well-integrated data from which information on population density, dynamics, movement, and behavior can be derived. The data gathered in this study have not been completely analyzed and cannot be fully evaluated until comparisons with similar studies in different areas can be made. The main findings are presented now to obtain the advantage of criticism and with the hope of encouraging additional studies. Only one method of the many available for estimating populations from banding data is discussed here. Some other method may prove to be more useful.

It was demonstrated in this study that the home-range of some species of passerine birds (*e.g.*, Wood Thrush) is considerably greater than the singing territories of the males. This conclusion has important implications in population studies and in the evaluation of effects of insecticides and other pest-control measures. These findings will be more completely analyzed and discussed in a subsequent publication (Robbins & Stamm).

Evaluation of this method and its comparison with other techniques will be aided greatly if some standardized method of operation and analysis is generally adopted by those conducting such studies. It is quite likely that some other arrangement or number of nets may be superior to that used here. This can be demonstrated best if such variations are tested simultaneously with the present arrangement in the same habitat. Studies in different habitats, seasons, and populations with different densities and species and age composition will produce a variety of results. Such differences can be evaluated only if a thoroughly standardized technique is employed. It is suggested that, where possible, the present arrangement and number of nets be used. Some modifications will be mandatory in certain situations as, for example, in areas where it is not possible to avoid or is desirable to include edge. It is suggested that, in applying the present method to include forest edge, a 2,000-foot line be located parallel to and just inside the edge and that 700 feet from either end of this line a 1,000-foot line extend into the forest at right angles to the edge. Such a pattern actually entails 800 feet less wasted distance per circuit than that used here and will largely preserve the sampling of habitat, numbers of territories intersected, and detection of movement inherent in the arrangement used in the present study.

A standardized schedule of operation also will aid in comparing different studies. On the basis of findings in this study the following is tentatively suggested. It appears that two 6-day periods of netting with relocation of the nets between periods will be most satisfactory. This schedule of operation will allow the estimation of the population

on a recapture basis by employing successive periods in calculations. The first 3-day period can be used in calculations with three succeeding 3-day periods, the second 3-day period with 2, and the 3rd with 1. The first 6-day period then can be used with the last 6-day period. The 7 estimates thus obtained can then be averaged to yield a definitive estimate. Such a procedure minimizes the effects of chance variation. This method was used in arriving at the estimates in Tables 6 and 7.

This method of obtaining information on a bird population is especially well adapted to studying the activity of agents such as arthropod-borne viruses. Birds can be bled from the jugular vein and, by virus isolation and serologic studies, information on the activity of the agent can be obtained on a current basis as well as by revealing differences between successive study periods and between different localities. For example, if one considers the first and last 6-day periods for which population estimates were made, 22 per cent of the birds captured during the first period or 13 per cent of the total population present was recaptured during the second period. Many of the recaptures were made after an interval sufficiently long to show conversion from negative to positive on serologic tests.

SUMMARY

1. Progress is reported toward development of a method of bird-population study based on mist-netting and banding. A definite pattern of arrangement and schedule of operation are presented.
2. Nets were operated for a total of 4200 net-hours during which 966 captures were made (23.0 birds per 100 net-hours). A total of 431 adult breeding birds were banded and 38 per cent of them were recaptured.
3. A breeding-bird census was made simultaneously in the same area by the Williams spot-mapping technique.
4. Estimates of population by recapture agreed closely with the spot-mapping census.
5. Some birds are demonstrated to have overlapping home-ranges much larger than their singing territories.
6. Recruitment and net-shyness distort recapture estimates of population but the method allows detection and assessment of their influence in the population dealt with here.
7. The method produced integrated information on population density and dynamics, movement and behavior.
8. The procedure is especially well adapted to studies of disease agents in bird populations.
9. A simple scheme for description of the habitat in terms of relative abundance and frequency of occurrence of tree species was used.

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A METHOD OF MIST NETTING WOODCOCKS IN SUMMER*

By WILLIAM G. SHELDON

The purpose of this paper is to describe a technique of capturing American woodcocks *(Philohela minor)* with Japanese mist nets during the summer months in central Massachusetts. Low (1957) has thoroughly described mist netting techniques, mostly for passerines. Woodcocks present a unique netting problem requiring certain specific refinements of the technique heretofore described. It is possible that methods described here could be productive for other species as well.

Liscinsky and Bailey (1955) described a method of catching limited numbers of woodcocks in summer and fall by erecting funnel nets in favored summer feeding and resting areas. During the summers of 1953 and 1954, approximately 25 woodcocks were captured in similar traps set primarily for ruffed grouse by personnel of the Massachusetts Cooperative Wildlife Research Unit in central Massachusetts. Summer observations of evening behavior of woodcock led to the discovery of certain open fields where woodcocks light at dusk. The regularity and

*This is a contribution of the Massachusetts Cooperative Wildlife Research Unit supported by the University of Massachusetts, the Massachusetts Division of Fisheries and Game, the U. S. Fish and Wildlife Service and the Wildlife Management Institute.

pattern of these flights suggested the possibility of mist netting for the purposes of banding as well as for records of sex, weights, number of juveniles, and molt sequence. A further publication will describe this behavior and results in detail. Initial attempts at netting began in 1953 when only 10 birds were captured in mist nets. Experience in making 675 captures from 1953 to 1959 form the basis of this paper.

Nets:—

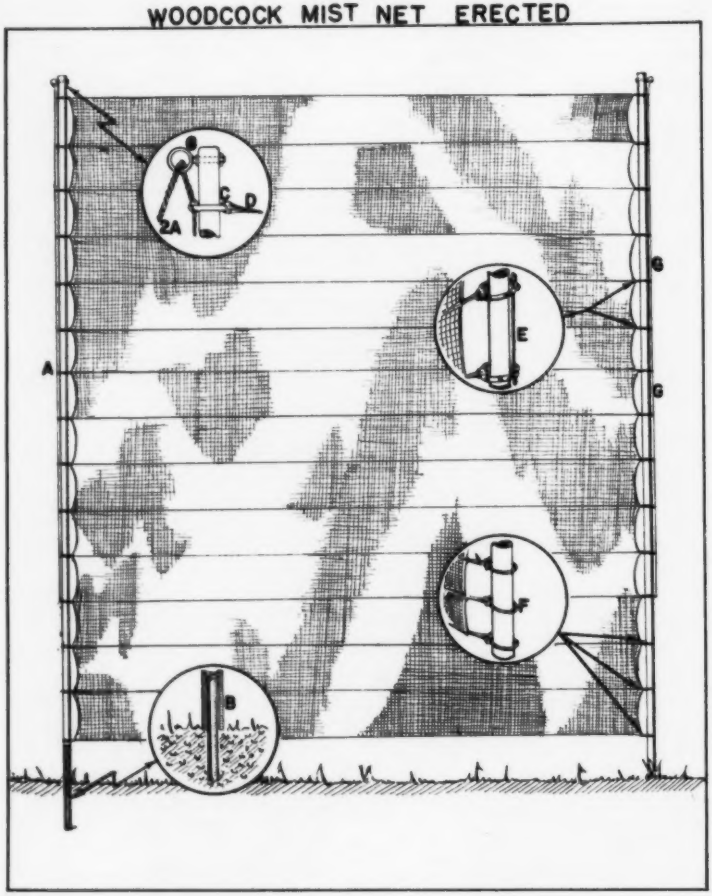
Three different types of nets were used. All have captured some birds. The highest quality silk thrush nets (1¼″ mesh) were most satisfactory. Nylon nets of approximately the same size were effective, but did not have as mush horizontal slack as the silk nets. Warbler nets were used in 1955. If set with sufficient slack, they successfully took woodcocks, but were too light to be durable. Shipments of silk nets from the same source in Japan varied in quality. These nets were ordered through E. A. Bergstrom from an agent in Japan contacted by Oliver Austin, Jr. Because nets used to capture woodcocks were on permanent sets and were exposed to all weather conditions from mid-June until mid-September, the test was very severe. During 1957, the nets received had relatively less twist in the threads, the dye faded quickly and the nets deteriorated in about six weeks. The best quality nets lasted from four to six months. In 1958, using the best quality silk nets, exact records were kept in one netting area of the number of birds hitting the nets and being captured. Of 91 woodcocks hitting the nets, 72 (79 per cent) were netted. The great majority of the escapes were birds hitting the edges of the nets. Some woodcocks which virtually hovered when coming in to light at a slow rate of speed escaped from the main body of the net. Almost all fast-flying birds were caught unless they hit edges.

Methods of erecting sets of nets:—

After experimenting with bamboo and hardwood poles, the most satisfactory type of pole proved to be aluminum television aerial poles which come in ten-foot sections 1″ inside diameter. They are light, sturdy, and do not rust or deteriorate for an indefinite period when exposed to weather. To be effective for woodcocks, the nets must be a minimum of 14′ or 15′ in height. We put two 10′ sections of television poles together so all our nets were 20′ in height. Four-foot ¾″ (outside diam.) pipes were driven 2′ in the ground at each pole site. Each pole was placed on a pipe (Figure 1B). No height was lost by having to drive a pole in the ground, and the poles were solid. Two 30′ sets of nets were erected experimentally, but were unsuccessful since these nets were backlighted by evening sky and visible to most woodcocks approaching the netting sites. In most cases, each 20′ pole required one guy line. Four or five sets of nets were often set in series so that one pole supported two sets of nets. Birds captured above our reach were taken out with an eight-foot stepladder, but we soon found it just as rapid to lower the nets to extract a bird.

Since it was necessary to cover a vertical area from about 2′ above the ground to 20′, at least three four-tier nets were used (Figure 1). To avoid gaps between these nets, which are inevitable in 12 meter nets even when the horizontal strings are taut, the top net was first tied to

FIGURE 1
WOODCOCK MIST NET ERECTED



the poles and the top tier of the next net was tied to overlap the bottom tier of the net above it.

. The loops of each net were tied to heavy rubber bands which in turn were tied to rings of 2″ inside diameter which slipped up and down the poles (Figure IC and D). To catch woodcocks, the pockets must be deep enough to drop at least half the vertical depth of the tier immediately below. This vertical distance was positively controlled by the space between the rings. The latter were tied on one vertical string, each spaced a specific distance (depending on type of net) from the ring next to it (Figure 1E and G). A heavier string was tied to the top ring and run through an eye bolt or pulley at top of pole

FIGURE 2
ERECTING WOODCOCK NET

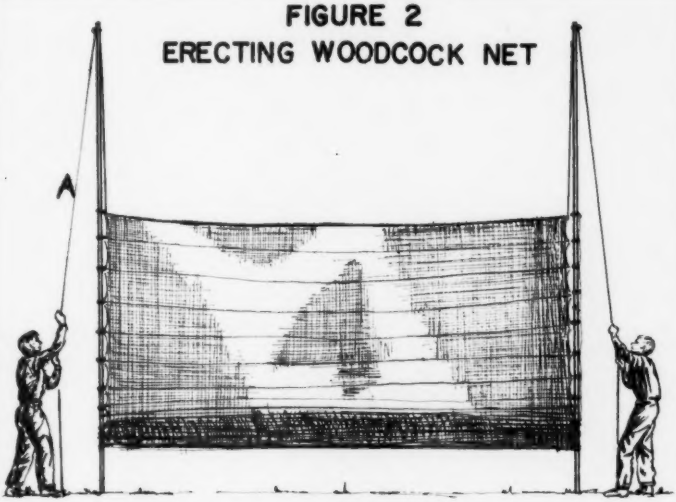
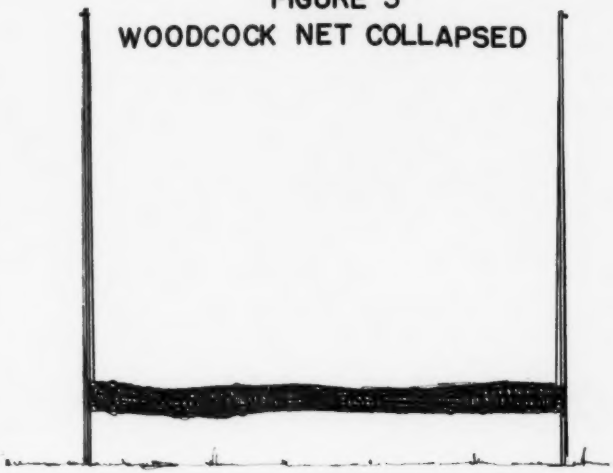


FIGURE 3
WOODCOCK NET COLLAPSED



and down to ground (Figure 1-2A and Figure 2A). The operator pulled the nets up much as one pulls a flag up a flagpole (Figure 2). The bottom three loops of the lowest net were attached directly to the poles by rubber bands (Figure 1F). After a netting period, these loops were pushed together vertically to bunch the net about 4′ above the ground. After completion of netting, the rings supporting the higher nets are run down and supported by the lowest net, thus leaving all nets collapsed (Figure 3).

Placement of nets:—

Three separate sites were netted. They varied in size from ½ acre to 2½ acres. Placement of the nets proved the key to successful captures. The smallest field (Area #1) of only ½ acre was ringed with nets so it was virtually impossible for a bird to come in and escape without hitting a net. The field was narrow and long. Nets ringed the perimeter and several were placed at right angles across the width of the field. Eight sets of nets sufficed to effectively cover the field. Area #2 was about two acres in size. Placement of nets was determined by observation of the flight paths of incoming birds. Four sets of nets were set in a solid bank across the width of the field, and separate sets covered the usual flight paths of the birds. Ten complete sets proved successful. Area #3 was about 2½ acres in size and was covered effectively by banks of nets set in a broad pattern. Eight sets were required. The open end was bordered by relatively tall plantation pines providing a high flight lane seldom used except by birds flying too high to hit the nets. Woodcocks which are netted usually fly into the field just over the tops of the trees or in any break between tree clumps. In some instances, the flight paths were channelized by cutting small trees on the field edge, thus creating a natural approach route.

Locating netting fields:—

All netting fields were near the center of spring breeding grounds, and all were used as singing grounds by males during the mating season. They varied widely in vegetation. Two were on high, dry hills, and the third in a relatively lower area. The ground was very dry, and trees immediately surrounding the perimeter were seldom more than 20′-30′ in height. Fields can only be found by constant evening observation.

Duration of netting:—

The most successful netting months were in June, immediately following the breeding season, until mid-July. Birds have been captured all summer and as late as October 10, but in late July, August and September, evening flights are erratic. Of the 675 birds netted, over 500 were captured before August 1.

Length of evening activity:—

Nets were erected half an hour after sunset on clear days and slightly earlier on overcast days. Woodcock activity begins at the same light intensity as spring courtship performances begin. From the time the first bird was seen, all activity ceased within a maximum of 15 minutes. Usually the duration of activity was slightly more than five minutes. Nets left all night until after dawn failed to capture birds.

Effect of weather:—

Windy evenings yielded few birds. There appeared to be less activity and often the birds detected the movement of the nets. Several years of weather records failed to reveal any positive correlation between weather conditions and bird activity. Cool evenings with temperatures between 55°-65° often yielded a good catch, and just as often were unproductive. Extremely hot days followed by late afternoon thundershowers and a windless, humid evening constituted consistently successful conditions.

Number of birds seen or captured per evening:—

Birds observed over the netting fields varied from one or two to over 20. Many passed over the field without attempting to light. After mid-June until mid-July, one of the best fields yielded an average of approximately three birds per trap night. Records of high catches include two instances of catching 10, three records of catching eight, three instances of catching seven, and several evenings when six were captured. After August 1, the catch dropped to under one bird per trap night.

Conclusions:—

The method of mist netting described above is unproductive as compared to netting records for many passerines. Sufficient woodcocks to yield significant scientific data on age and sex ratios, weights, molt pattern, etc., require netting every evening over at least six weeks of time. When help was available, we often ran three netting fields simultaneously.

Acknowledgments:—

A number of graduate students assisted from time to time in the field. Special acknowledgment is due Wendell Dodge, Raymond Gehling, Ethan Howard, Jr., and Gardner Hobart. Alfred Godin did the drawings of Figures 1-3.

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BANDING ROBINS AT NORRISTOWN

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Robins *(Turdus migratorius)* are abundant summer residents of southeastern Pennsylvania. In recent years a few of this species are found during the winter season. In the winter of 1957-58 large flocks were to be seen.

However, as yet we have no evidence of any individual being a permanent resident. In fact, all available records tend to prove that the summer birds of this area move to the deep south to winter (this we shall show later in the paper). There are many who believe that wintering flocks are summer residents of far northern areas that move into the northeastern states to winter.

This species moves into the area in good numbers in early March, and before the month is over they are quite abundant. During April the nesting season gets underway rapidly. We have about three acres of woodland on our place, one third being old deciduous woods, mostly hickory and various oaks, also a grove of tall evergreens (white pine). Then there are many wild cherry and mulberry trees which provide good food for Robins in late spring and summer months. This species nests in good numbers all over our grounds. During the heat of summer, flocks of young of the year from over much of nearby areas come into our woods to seek welcome shade.

Our station was put in operation in July of 1921. For seven years we had a single sparrow trap in use and 36 of this species wandered into it. Late in 1928 water traps came into use. In 1929 we placed several single chardonneret traps out with waterdrips as bait; that year we caught 68 Robins.

We noticed that many robins walked around these traps looking for a ground entrance during the summer. We at once saw the need of a ground entrance trap to use with water as bait if many of this species were to be taken. That winter the Middleton Thrush Trap came into being. In May of 1930 three were put out, and our summer catch mounted to 164 Robins. The summers of 1932 and 1936 turned out to be our banner years as we banded 395 each year. Not since then has this species been so abundant. We kept well over 200 each year until 1949; since then our annual catch has ranged from 75 to 150. We operate the water traps from April 15th on, using three Brenkle and six thrush traps. A dry hot summer brings many robins into the woods while in a wet cool summer water traps have little attraction.

TABLE 1 Total Captures—

Number banded	4887
Number repeats	369
Number of returns	78
Recovered elsewhere	42

We believe that the flocks of young of the year moving into our woods during the heat of summer actually come from over a considerable part of the surrounding territory. Consequently, even if they return in later years there is little chance of them coming to the trapping area. We feel that the low rate of returns from immature birds (less than 1%)

TABLE 2 Division of the Age Groups—

	Adult	Immature	Age Unknown	Totals
BANDED	580	4180	127	4887
PERCENTAGE OF TOTAL	11.5	85.9	2.6	100
REPEATS	9	360	——	369
RETURNS	45	33	——	78
RECOVERIES	7	32	3	42

in later years is not the true return rate, as many may find their way back to the general area but not to the small station grounds.

For this reason, in this paper we have included as returns all birds found within a radius of three miles around the station. In previous papers (with other species) we have classed only as returns those individuals taken in the traps or found within an eighth of a mile of us, beyond this all are recoveries.

TABLE 3 An albino robin that holds our longevity record—
Adult No. 39-369745 banded August 15, 1939

Return	1	April 1, 1940
"	2	April 2, 1941
"	3	March 30, 1942
"	4	April 5, 1943
"	5	March 23, 1944
"	6	April 1, 1945
"	7	June 1, 1946
"	8	May 4, 1947

This bird was a partial albino, body all white, wings and forehead normal; at least one year old when banded, when last seen it was nine years old and may have been more. This bird was so unusually marked that we could observe its movements all summer of each of the years as it ranged all over our place. Some years it nested right on our farm while in others it nested in nearby gardens. At no time did we learn of its nesting site until the young had flown; thus we had no opportunity to determine if its young showed any traces of albinism.

Two other return records are of special interest—

ADULT No. A322102 banded June 15, 1929
Return 1 on April 13, 1930
" 2 on April 20, 1931
" 3 on April 23, 1932

NESTLING No. 626740 banded in nest July 18, 1928
Return 1 on May 14, 1930
" 2 on May 28, 1932

This bird was captured every other year and in 1932 was mated to A322102 and was nesting in a wild cherry tree just 50 feet from the tree in which it had been banded.

AGE SUMMARY

26	lived	to	be	2	years	old
26	"	"	"	3	"	"
17	"	"	"	4	"	"
1	"	"	"	5	"	"
1	"	"	"	6	"	"
1	"	"	"	7	"	"
1	"	"	"	8	"	"
1	"	"	"	9	"	"

RECOVERIES

Of 11 birds recovered within 50 miles from station, 3 are of special note—

One immature banded in 1942 was found dead at Glenside in 1946.

One immature banded in 1938 was found dead at Glenside in 1946. This is 18 miles from station.

One immature banded in August 1941 was caught in April 1942 at Princeton, New Jersey by Charles Rogers.

SOUTHERN RECOVERIES

BAND NUMBER	DATE BANDED	DATE OF RECOVERY	PLACE OF RECOVERY	CAUSE OF DEATH
45-314404	6-23-47	1-14-48	Newsons, Va.	caught
503-82223	5-1-53	1-28-54	Sumter, S. C.	inj. released
42-355271	7-19-46	11-21-46	Nichols, S. C.	found dead
B337664	8-1-32	12-26-35	Fair Bluff, N. C.	found dead
B385242	9-24-32	3-1-34	Whiteville, N. C.	killed
B385783	6-27-33	1-10-38	Raleigh, N. C.	caught by cat
36-324616	8-22-36	3-7-43	Nashville, N. C.	killed
36-327823	7-7-37	2-11-41	Smithfield, N. C.	found dead
41-332903	8-17-41	2-6-42	Fair Bluff, N. C.	found dead
A322139	7-24-29	11-5-30	Faceville, Ga.	found dead
B377858	9-12-32	1-17-33	Pearson, Ga.	found dead
35-327051	9-23-35	3-1-37	Chula, Ga.	caught
36-324623	8-23-36	2-15-37	Jesup, Ga.	found dead
38-323999	7-12-39	1-25-40	Hazelhurst, Ga.	found dead
523-83893	7-17-55	1-7-58	West Green, Ga.	found sick
A235478	6-30-30	1-11-33	Plant City, Fla.	found dead
B329651	6-9-32	1-18-33	Tampa, Fla.	killed
B337629	7-20-32	12-20-32	Brandon, Fla.	killed
B385793	6-28-33	3-2-37	Opa Locka, Fla.	shot
C301670	6-3-34	2-26-37	Mulberry, Fla.	shot
C301768	7-23-34	3-7-37	Groveland, Fla.	killed
36-324598	8-21-36	2-1-39	Lithia, Fla.	killed
36-324609	8-21-36	2-28-39	Central Wauchula, Fla.	found dead
36-327938	7-22-37	1-1-40	Cornwall, Fla.	killed by cat
38-323828	9-14-38	2-15-39	Jacksonville, Fla.	found dead
B385748	6-21-33	3-3-34	Wetumpka, Ala.	found dead
36-327985	9-7-37	1-30-39	Mobile, Ala.	found dead
523-83557	7-4-54	1-17-56	Stapleton, Ala.	found, wing broken
C301651	3-24-34	2-24-36	Magnolia, Miss.	caught
35-327088	5-18-36	5-5-37	Tupelo, Miss.	injured, died

131 North Whitehall Road, Norristown, Pennsylvania.

THE EVENING GROSBEAK INCURSION IN THE NORTHEAST WINTER OF 1957-58*

By MARY S. SHAUB

Despite an unusually dry season in many parts of northeastern United States and the Maritimes during the summer of 1957, the nesting season was apparently unusually favorable for the Evening Grosbeak *(Hesperiphona vespertina)*. Reports were received from many localities in Maine, New Hampshire and Vermont and W. A. Squires wrote from New Brunswick that the Evening Grosbeaks "apparently bred almost throughout the Province." In general in the northeast the native food supply was variable, especially the cone crops, so despite a mild autumn it was assumed that there might be a sizeable Evening Grosbeak incursion.

"In late August and September they were as common as migrating robins" in NEW BRUNSWICK "and then in October practically all of them left." (W. A. Squires). In southern ONTARIO Mrs. D. H. Speirs reported an early incursion and during September and October grosbeaks were observed in this Province from the Thunder Bay District north of Lake Superior east to Carleton Co. and south to *Hamilton* and then southwest to *Leamington* on Lake Erie. The flocks varied from a few birds to 100 at *Havelock*, Peterborough Co., Oct. 6th, (Bunkers), and were seen largely feeding on Manitoba maples, black cherry and sumac. One of the most significant ONTARIO reports came from *Scarborough* where on Oct. 6th, "at about 11:00 P.M. p-teer notes were heard from a flock traveling west at night. Three calls were heard; the night was clear." (Taylor, fide D. Speirs).

To the south the incursion was early and widespread in New England. Christopher Packard, Director of the Portland, Maine Museum of Natural History, reported "a fine heavy movement of Evening Grosbeaks in Maine the first week of September and increased numbers throughout the month." During September and October grosbeaks in flocks of 10-250 birds were reported from 32 MAINE localities extending from *Houlton* in the northeast to *Kittery* on the southeast coast and from inland points—*Kokadjo* in the north and *Norway* in Oxford Co. In most instances arrival dates were mid-Sept. to mid-Oct., the earliest dates being *Kittery*, Sept. 4th, (V. Hebert); *Kokadjo*, Sept. 14th, (E. Sherman); *Monmouth*, Sept. 12th, (fide H. Ramsdell); and *Skowhegan*, Sept. 12th, (R. E. Bernard).

In NEW HAMPSHIRE flocks built up rapidly from the first arrivals at *Berlin*, Sept. 1st, (M. Hoos); *Colebrook*, Sept. 1st, (E. Ball); *Durham*, Sept. 5th, (V. H. Smith); to flocks of up to 100 birds at 32 localities in all parts of the state from *Second Connecticut Lake* in the extreme north to *New Ipswich* in the southern central part of the state almost at the Massachusetts line.

In VERMONT native foods appeared to be scarce. In the north among the conifers only the Norway spruce had cones (J. Watrous) and in southern Vermont some wild apples had fruits and others did not, beechnuts were lacking or very scarce and the cone crop was variable, (E. Downs, E. and A. Macdonald). Only six localities reported in Sept. and Oct. From *So. Londonderry* Mrs. Downs wrote, "after the nesting season here the Evening Grosbeaks remained in flocks of varying size from a few to over 30 but numbers dwindled around Sept. 21st, about 30 were noted on Oct. 8th and during the month 20-40 were in and out of the feeders. Numbers of hawks and shrikes may have accounted for the low numbers of grosbeaks on some days in Sept. and Oct." At *Woodstock* grosbeaks "appeared in considerable numbers about the middle of Sept. and increased to 50 on Sept. 30th. This is their earliest appearance in 10 years. From sight obser-

*Contribution No. 23 from the Shaub Ornithological Research Station.

vations there appear to be far more males than females." (T. S. Fillebrown).

In MASSACHUSETTS the incursion got under way early with coastal areas reporting first: *Provincetown*, Sept. 2nd, 3 birds, (Gammell); *Marblehead Neck*, Sept. 9th, one bird, (D. Searle, RNEB*). Thereafter in all parts of the state from *Nantucket* to *Pittsfield* flocks of a few individuals up to 100 birds, *(Northampton*, Sept. 30, M. Sampson), were seen during Sept. and Oct. in 53 localities. In western MASSACHUSETTS where box elder seeds were abundant, for about 2 weeks early in Oct. hundreds of birds passed through *Adams, No. Adams* and *Cheshire*. The numbers were so large that Evening Grosbeaks had stripped most of the box elders by mid-Oct. of a seed supply which in other years would have lasted at least two months. Late nesting in this general region was indicated by the presence on Oct. 6th of four male and two female juvenals still in juvenal plumage. The birds came to the feeders even before the box elder, Norway and sugar maple seeds had been cleaned up. Males predominated at *Florence, Gloucester* and *Great Barrington*. At *Pittsfield* E. L. Dunbar reported that "seeding trees, including all maples, were exceedingly heavily seeded, beechnuts were plentiful and it was a fairly good cone year."

In RHODE ISLAND, despite the heavy Evening Grosbeak incursion, this state had only one winter report: *Adamsville*, Sept. 2nd and 3rd, 10-12 birds (W. G. Brackett, RNEB). It seems singular that this New England state should have been by-passed by the birds in favor of the southern states.

CONNECTICUT reports for Sept. and Oct. came from only six localities, the earliest being *Marlborough*, Sept. 27th, 7 (Peter Isleib, RNEB), and the largest flocks only 20 birds at *W. Hartford*, (A. Bergstrom).

In NEW YORK STATE the earliest arrivals were: *E. Chatham*, Sept. 24th, 1 male (E. Radke); *Hornell*, Sept. 29th, flock (W. Groesbeck, fide S.H.*); *Morrisville*, Sept. 29th, 9, (Ada Carter, fide S.H.); *Sapsucker Woods*, Ithaca, Sept. 30th, small flock (D. Allen, fide S.H.). Otherwise NEW YORK reports indicated arrival dates in Oct. or later. The grosbeaks were quite well distributed from *E. Chatham* to *Rochester* but generally the flocks were small, the largest number being 50 birds noted Oct. 22nd at *Woodstock* (Mrs. Lewis, fide S.H.).

PENNSYLANIA had a good Fall incursion with Evening Grosbeaks reported at 10 localities from *Allentown*, Sept. 24th, 6 (T. Hanson, fide M. Broun), to *Ridgway* in the western part of the state, Oct. 15th 125-150 (Trudy Smith in *Ebba News*, **21**(2): 34). From *Hawk Mt.*, Kempton, M. Broun wrote, "we saw at least 880 Evening Grosbeaks migrating here during Oct., probably many more passed through." At *State College* the first grosbeaks were seen Oct. 4th and they were observed throughout the month in large numbers feeding on box elders near town and in many of the mountain areas. (D. Bordner).

In MARYLAND Evening Grosbeak arrival date records were broken on Oct. 12th when one bird was seen at *Monkton*, Baltimore Co. by Andrew Simon. During the month small numbers were reported from *Annapolis, Bethesda, Cabin John, Denton, Trappe* (fide C. Robbins); at *Laurel* and *Rock Point* (R. F. Stewart), and at *Unity*, S. Low).

Reports from farther south in Oct. included VIRGINIA: *Washington* area, Oct. 12th on, noted (Paxton, p. 51*); *Charlottesville*, Oct. 12th on (Paxton, p. 52); *Clifton Forge*, from Oct. 30th, (Paxton, p. 52); *Richmond* area, Oct. 15th, noted (Paxton, p. 50). Two NORTH CAROLINA reports included: *Halifax*, Oct. 27th, 11 flying north, (L. Gstell); and *Newfound Gap*, Oct. 30th, one bird (fide B. R. C.**).

In WISCONSIN at *Armstrong Creek* groups of Evening Grosbeaks were observed Sept. 3rd, Oct. 15th, 20th and 26th with up to 30 birds noted at the end of Oct. (R. Stefanski); and at *Mishicot* a flock of about 30-40 arrived Oct. 28th (B. Brouchoud).

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*RNEB refers to *Records of New England Birds*, published by the Massachusetts Audubon Society, Boston, Mass.

*S.H. refers to Mrs. Sally Hoyt.

*Paxton, Robert O., "The Evening Grosbeak in Virginia 1957-1958," *The Raven*, **29**(5 and 6): 49-52, May-June, 1958.

**B.R.C. refers to unpublished manuscript by B. R. Chamberlain.

NOVEMBER

Weather continued favorable during Nov. with an open season in most of the Maritimes and New England. In NOVA SCOTIA after the Sept. 24th report no Evening Grosbeaks were seen until late Nov. (R. Tufts). Mrs. D. H. Speirs had fewer ONTARIO records in Nov. with only 20 localities reporting flocks of from a few birds to 125 on Nov. 3rd at *Rondeau Park* headquarters, Kent Co., and 200 on Nov. 25th at *Brockville* (Ivy Jarvie). In the Nipissing Dist. at *W. Ferris* "the prospect for food for the winter birds does not look too bright. Other than the lack of Manitoba maple samaras . . . there are no mountain ash berries, very few winter berries, the dogwood and nannyberry bushes appear to be mostly stripped of what fruit was on them." (Mackie, fide D. H. Speirs). Where noted the males predominated in numbers.

In MAINE the distribution ranged from *Calais* to *York Harbor* with flocks ranging from 10-60 birds as reported from 12 localities. NEW HAMPSHIRE was represented by only four localities with males predominant at *Durham* and two immature males observed by Dr. H. C. McDade at *Hanover* on Nov. 1st. In VERMONT 20-40 Evening Grosbeaks were seen daily at *So. Londonderry* (Downs); 8 males and one female on Nov. 11th at *Topsham* (Macdonalds); and 200 birds estimated in and around *Woodstock* (T. Fillebrown).

The great interest in birds in MASSACHUSETTS was reflected in 15 reports from coastal points *(Rockport, W. Gloucester, Bourne, Cohasset* and *Duxbury,* RNEB), to *Adams, Great Barrington* and *Pittsfield* in western MASSACHUSETTS. The largest flocks were: *Cohasset,* Nov. 18th, 50 (V. Visser, RNEB); *Great Barrington,* up to 75 daily by the end of Nov. (E. Hull); *Hingham,* Nov. 24th, 100+, (RNEB); *Marshfield,* Nov. 1st. 100 (M. O'Brien, RNEB). Males predominated at *Northampton* (Shaub), *Pelham* (J. Seitz), and *Sterling* (Allen Farm). Otherwise sex ratios were not indicated.

From CONNECTICUT came reports of a few grosbeaks at *New Fairfield, Norwichtown, W. Simsbury* and *Windsor.*

In NEW YORK STATE, during Nov., 13 localities from *E. Chatham* to *Corning* had flocks of variable size and composition most of the month, the largest numbers being about 50 at *Canajoharie* (Mrs. L. Putnam), and about 50 by mid-Nov. at *Etna,* with the sexes about equal (S. Hoyt).

Eight localities in PENNSYLVANIA from *Hawk Mt.* to *St. Mary's* reported in Nov. with the largest flocks of over 100 at the Hawk Mt. feeders by Nov. 8th (M. Broun), and large numbers observed feeding on box elders near *State College* and in many mountain areas during the month (D. Bordner).

In MARYLAND by the end of the month every county on the lower half of the Eastern Shore had been represented by Evening Grosbeak reports (C. Robbins). In VIRGINIA through Nov. the birds were noted in the *Richmond* and *Washington* areas (Paxton, p. 51); at *Charlottesville* and *Clifton Forge* (Paxton, p. 52); and 12 birds were seen Nov. 18th at *Waynesboro* (Paxton, p. 52).

Southern records continued to increase with a male observed Nov. 1st at *Elizabethton,* TENNESSEE (F. Behrend). NORTH CAROLINA Nov. records included: *Asheville,* Nov. 20th, 5; *Boone,* Nov. 7th, about 75; *Elkin,* Nov. 27th, 1; *Mattamuskeet,* Nov. 22nd, 35-40; *Raleigh,* Nov. 17th, about 300 (B. R. C). At *Aiken,* SOUTH CAROLINA, Mrs. H. S. Hatcher observed a male on Nov. 19th.

From the Midwest R. A. Stefanski reported 30 birds on Nov. 3rd at *Armstrong Creek,* WISCONSIN.

DECEMBER

In Dec. at *Baddeck,* NOVA SCOTIA, 22 birds were noted on the 29th by Mrs. M. W. MacRae and 6 reports came from NEW BRUNSWICK. In ONTARIO grosbeaks were quite well distributed and large flocks observed at *Huntsville* (Waters, fide Speirs), a daily flock of 7-20 birds at *New Liskeard* with 16% females (Anderson, fide Speirs), and the largest flock, 140 birds, at *Peterborough* on the 28th (fide Speirs).

In New England the weather continued to be fairly mild in Dec. and grosbeaks were well distributed. From MAINE came reports from 21 areas from *Houlton* to *York* with generally fair-sized flocks, the largest counts being 50-60 on the 12th at *Cumberland Mills,* (I. A. Werner), 55 at *Warren* (Lord), and 45 at *Castine*

(Morse). In NEW HAMPSHIRE grosbeaks were noted from *Groveton* in the north to *Nashua* in the south with the largest numbers at *Bedford* from mid-Dec. to the 31st, 40 birds daily (Kennard) and *Meredith*, Dec. 30th, 49+ (Pardee, RNEB). VERMONT Dec. records came from *Montpelier*, 40-50 during the month (Miskelly and Allens, RNEB); *So. Londonderry*, 8-20 daily with very few females (Downs); *Topsham*, a few noted on 6 days in Dec. (Macdonalds); and *Woodstock*, 40 birds during Dec. (Fillebrown).

MASSACHUSETTS was well represented in Dec. with grosbeaks reported from many localities in flocks of a few birds up to 100 from the coast to the Berkshires with males predominant where sexes were noted. The largest consistent flocks were reported by J. Seitz in *Pelham* where from Dec. 9th to 30th daily flocks ranged from 75-100 birds. The numerous reports from eastern MASSACHUSETTS were undoubtedly due in large part to the active birding interest there and consistent reporting to the Massachusetts Audubon Society.

In CONNECTICUT during Dec. only 4 localities reported: *Hartford*, small numbers during Dec. (Parks); *New Hartford*, 60 birds at the end of the month (Mrs. F. Hartman); *Norwich*, Dec. 4th, 3 males; Dec. 18th, pair (Mrs. H. Knup); and *Windsor*, Dec. 28th, 43 (M. Belden).

In NEW YORK STATE 19 localities from *E. Chatham* to *Buffalo* recorded grosbeaks with generally small numbers except *Etna* where 80 birds were present by mid-Dec. with males predominant but sexes about equal by the 31st (S. Hoyt). Males were noted predominating at *E. Chatham* (E. Radke), *Hillsdale* (Mrs. R. Green), *Nassau* (B. Shineman), *Peru* (E. Washbourne), and *Trumansburg* (Mrs. L. Warren, fide, S.H.).

The first winter NEW JERSEY report for 1957 came from Mrs. Joseph Cardinali at *Jamesburg* with 20 birds on Dec. 6th.

PENNSYLVANIA observations continued to come from *Hawk Mt.* (M. Broun) to *Coudersport* (R. Lyman) with 100-150 birds reported at the latter locality on Dec. 10th. At *Hawk Mt.* by the 28th there were "about 200 in the area with numbers fluctuating from 50 or less to 200" (M. Broun).

On Dec. 5th C. Robbins wrote from *Laurel*, MARYLAND, "Thanks to a foot of snow that fell yesterday (heaviest in 15 years) the first Evening Grosbeak, a female, came to our feeders today. . . . So far we have had reports from the following MARYLAND counties: Allegany, Montgomery, Prince Georges, Ann Arundel, Charles, Baltimore, Talbot, Dorchester, Wicomico and Somerset."

In WEST VIRGINIA, Pocahontas Co., grosbeaks were abundant in Dec.*

VIRGINIA records doubled over the previous month with *Nansemond Co.*, Dec. 30th, 5; *Richmond* area, small groups in Dec.; *Washington* area, noted in Dec.; *Williamsburg*, Dec. 23rd to 30th, noted at feeder (Paxton, p. 51). Also *Charlottesville* had grosbeaks in Dec., as did *Clifton Forge* and *Hot Springs* while *Shenandoah Nat. Park* reported 7 on the 22nd and *Waynesboro* a maximum for the winter with 70 birds in Dec. (Paxton, p. 52). At *Mount Rogers*, Grayson Co. F. Behrend recorded that on the Christmas Bird Count 96+ were recorded at 5100′ altitude in spruce, balsam and birch on Cabin Ridge.

Thirteen localities in NORTH CAROLINA from *Ahoskie* on the coastal plain to *Roan Mt.* in the western part of the state had grosbeaks in Dec. in flocks of varying numbers from a few birds to a maximum of 50 as recorded by E. Pike at *Ahoskie* on the 29th. On the NORTH CAROLINA-TENNESSEE line on the 22nd a count of 93+ was made by the Audubon Christmas Bird Census at 5200′-6150′ altitude in coniferous forest (F. Behrend).

By Dec. the grosbeaks were fairly numerous in MICHIGAN with one to 268 birds observed from the 21st to the 30th in 18 localities, the majority from the Lower Peninsula.

JANUARY

Although winter weather continued mild in Jan. in the Maritimes, grosbeaks were noted in only a few places. In NOVA SCOTIA only the *Wolfville* area had these birds during the month (R. Tufts). In NEW BRUNSWICK at *Hampton Station* 9 birds were seen in Jan. (Mrs. A. Leatherbarrow); at *Kingshurst* 7 were noted from the 21st to the 25th (fide W. Squires); and at *St. John* a small flock

The Redstart*, **35(2): 50, Mar. 1958.

was observed during the month by R. Ryder. ONTARIO had about the same distribution as earlier but some flocks had increased in size with 100-125 daily at *Kingston* (Edwards), 50 on the 26th at *Victoria* (Saunders), and about 400 on the 10th at *Maple* (F. Lovesy). Where noted the males greatly predominated.

Fewer observations than earlier in the season came from MAINE with only *Cumberland Mills* (I. Werner), *Skowhegan* (Bernard), and *Mt. Desert* reporting and males predominated in each case. There was considerable observer activity in Jan. in NEW HAMPSHIRE from all sections with the largest flocks at *New Hampton*, over 40 birds (V. Hebert); a maximum of 200 at *Raymond* (Miller, RNEB); and 40 birds at *Bedford* (Kennard). Only five areas in VERMONT reported, with the largest numbers at *So. Londonderry*, maximum of 40 (Downs), and at *Montpelier*, 50 on the 15th (fide V. Hebert).

There was much more reported activity in MASSACHUSETTS with flocks noted from *Annisquam* and *Duxbury* on the coast to *Adams* in the west. Flocks varied in size, the largest numbers being 60-90 daily with 100 on Jan. 18th at *Pelham* (J. Seitz). Where noted males predominated about 3:1 with the exception of *Middleboro* where Mrs. Romaine noted 60% females in a flock of 28 on Jan. 9th.

Larger flocks were seen in Jan. in CONNECTICUT with a maximum of 80 in *Glastonbury* (Whittles, RNEB); 73 in *Hartford* (Parks); and 75 in *Windsor* (M. Belden).

Heavy winter weather brought large flocks to feeders in NEW YORK STATE during the month from *E. Chatham* to *Buffalo* with 100-125 noted at *Binghamton* (Mrs. R. Rivers, fide S.H.); 100 in the village of *Etna* daily (S. Hoyt); 100 at *Freeville* daily (Landon, fide S.H.); and a flock of 200 seen on box elder at *Rome* (Mrs. B. Aspinwall, fide S.H.).

Only *Allendale* (Dater), *Ramsey* (Dater) and *E. Brunswick* (Mrs. T. Shelley), recorded any grosbeaks in NEW JERSEY in Jan.

In PENNSYLVANIA the birds were fairly widespread during the month with 300 at *Hawk Mt.* Jan. 20th with 70% females (Broun); and flocks of up to 59 birds at *State College* (D. Bordner).

More outstanding were the southern records with flocks at *Baltimore*, MARYLAND. Birds were also noted in VIRGINIA at *Churchville*, *Staunton*, *Monterey* and *Pine Ridge*. Other reports from this state included *Waverly*, *Richmond* area, *Washington* area, *Chase City*, and *Saxe* (Paxton, p. 51); also *Charlottesville*, *Waynesboro* and *Clifton Forge* (Paxton, p. 52).

F. Behrend noted flocks at *Burbank*, TENNESSEE, of over 50 birds and at *Roan Mt.* in the same state approximately 150 birds in coniferous forest at 5500-6100' altitude. Reports from the Carolinas included: NORTH CAROLINA—*Ahoskie* (E. Pike); *Durham* (Mrs. W. C. Davison); *Greensboro* (Mrs. C. E. Breckenridge); *Jackson* (Mrs E. Norfleet); *Washington* (Mrs. L. Carver); and *Wilkesboro* (W. Smith); SOUTH CAROLINA—*Columbia* (Mrs. J. B. Frazier); *Florence* (L. M. Dargan); *Hartsville* (Mrs. K. G. Kuehner); *Huger* (E. vonS. Dingle); and *McClellanville* (fide E. A. Mason).

Probably the most significant Jan. report was *Gadsden*, ALABAMA, where Mrs. B. P. Clark had one male on the 20th and 26th and two to three males daily from the 27th to the 31st. It is interesting to note that this is only the second year that Evening Grosbeaks have visited *Gadsden*, the first time being in 1955, and this is also only the second Evening Grosbeak record for the state of ALABAMA.

From *Muskegon*, *MICHIGAN*, Mrs. Harold Clover reported that on Jan. 11th the Evening Grosbeaks returned in great numbers with appearances in many areas. At *West Branch* in the same state Evening Grosbeaks arrived in Jan. and stayed all winter (Mrs. C. Martin).

FEBRUARY

During February very few grosbeaks were seen in NEW BRUNSWICK with only *Kingshurst*, *Rothesay* and *Salisbury* reporting (fide W. A. Squires). On the contrary the incursion continued to be heavy generally during Feb. in ONTARIO with a definite wave during the month and the birds were distributed from *Kirkland Lake* to *Ottawa* and south to *Ipperwash Beach* in Lambton Co. Large flocks were observed at *Kingston*, 250 on the 2nd (fide D. Speirs), and at *Richmond Hill*, 300 on the 9th (S. Gadsby). Mrs. Speirs wrote from the *Toronto* area, "A few Evening Grosbeaks went through this area last fall and remained here all winter, but this month there have been many flocks of them around, some containing upwards of 200 birds."

Many coastal points in MAINE had flocks of 10-70 birds during the month. The distribution in NEW HAMPSHIRE remained about the same as in Jan. with 100 birds Feb. 18th at *Peterboro* (fide V. Hebert), and 150-200 at *Raymond* on the first (fide V. Hebert). VERMONT reports indicated small numbers at *So. Londonderry* (Downs); *Rutland* (E. V. Page), and *Arlington* (Congdon).

The situation was different in MASSACHUSETTS with 48 areas well represented from all sections. Largest flocks were reported from *Great Barrington*, 40-100 daily (E. Hull); *Haverhill*, 100+ (RNEB); *Mansfield*, Feb. 3rd, 101 (A. R. Richardson); *Pelham*, Feb. 6th, 102 (J. Seitz); *Wareham*, Feb. 15th, 250-300 (RNEB); and *Winchendon*, Feb. 18th, 100+ (RNEB). Males were predominant where indicated.

In CONNECTICUT only *Hartford* reported in Feb., with daily flocks of 8-42 birds with varying sex ratios (G. H. Parks).

NEW YORK STATE had grosbeaks in 22 areas from *E. Chatham* to *Rochester* with males generally predominant. An interesting report came from A. Glen Acheson of *E. Setauket*, L. I., where on Feb. 17th 35-40 birds were noted with sexes about equal and the birds came daily through Feb. 27th. This was the first Evening Grosbeak occurrence on Long Island since 1951.

In NEW JERSEY only *Ramsey* had a few birds daily (E. Dater), and *Jamesburg* had several on Feb. 19th to 23rd (Mrs. J. Cardinali).

Distribution in PENNSYLVANIA was generally in eastern and central areas during the month with 18 localities indicating fairly small flocks with the exception of *Hawk Mt.* where from the first to the 16th there were heavy concentrations with 30% males and at least 550 birds were present during the third week of Feb. (M. Broun).

In MARYLAND at *Baltimore* a pair was seen Feb. 26th by L. Ford and at *Laurel* two pairs were noted on the 24th by C. Robbins. In WEST VIRGINIA *(The Redstart, op. cit.)* grosbeaks were observed at *Petersburg* Feb. 5th, at *Beckley* Feb. 15th, at *Winchester* in Feb., and at *Martinsburg* 20 birds were seen Feb. 13th to March 13th. In VIRGINIA Paxton, p. 51-52, reported as follows: *Clifton Forge*, flocks varying up to 175-180 during Feb.; *Fries*, three birds on the 21st; *Hot Springs*, noted in Feb.; *Roanoke*, one bird on the 21st and 22nd; *Lawrenceville*, about 50 on the 13th; *Williamsburg*, 20 on the 25th; and noted during Feb. in the *Richmond* area, *Washington* area, at *Charlottesville*, *Sweet Briar*, and *Waynesboro*.

NORTH CAROLINA produced a surprisingly large number of grosbeak records during Feb. with 16 localities reporting. At *Lenoir* the heavy snow of the 2nd brought large numbers to feeders and birds came daily in Feb. in flocks of one to 11 with females generally predominant (Mrs. J. B. Bernard). At *Jackson* about 30 birds were present from the first to the 8th (fide R. Parker). The largest Feb. report at *Ahoskie* was 13 males and 30 females on the 25th, and on other days from the 15th to the 27th females predominated (R. Parker). An outstanding report of 300-400 on the 20th came from *New Bern* (F. D. Conderman, fide B. R. C.).

In SOUTH CAROLINA eight localities had grosbeaks in Feb. with the largest flocks at *Camden*, 75 birds on the 9th (E. J. Wellborn, fide B.R.C.); and at *Dillon*, 30-40 birds on the 25th and 27th, (A. McCallum, fide B.R.C.).

GEORGIA had Feb. reports at *Eatonton* on the 3rd, large flock (F. W. Fitch, Jr., fide B.R.C.); at *Rome* on the first, one male (G. L. Hight, Jr., fide B.R.C.); and at *Thomson*, 30 miles west of Augusta, one female collected on the 4th (H. Hunt, fide, B.R.C.).

At *Gadsden*, ALABAMA, Mrs. B. P. Clark noted two to three birds Feb. first to 15th, 2 males on the 24th, about 50 on the 25th, and a few birds from the 26th to the 28th.

The Chicago Sunday Tribune for Feb. 9th reported many persons feeding grosbeaks in the area including: *Oak Lawn*, Ill., pair (Mrs. D. E. Frazier); *Wayne*, Ill., at least 3 pairs (Mrs. J. S. Giles); *Warrenville*, Ill., one bird (Mrs. Paul Daw); *Chesterton*, Ind., pair (E. A. Nickel); *Gary*, Ind., flock several times (L. Snyder); *Beverly Shores*, Ind., 3 birds (Mrs. E. S. Wheeler).

MARCH

During March Maritime reports included: *Wolfville*, NOVA SCOTIA, where Robie Tufts felt that the Evening Grosbeaks were present in greater numbers

than at any previous time with males outnumbering females at least 4:1; NEW BRUNSWICK, *Kingshurst*, near St. John, two birds on the 2nd and 3rd (D. Christie); and *St. John*, two birds on the 20th (R. Ryder). In southern ONTARIO grosbeaks were noted from the Temiskaming Dist. to *Ottawa* to *Toronto* with large flocks at a number of localities: *Cherrywood*, over 200 birds on the 8th and 9th (A. Bunker); *Ottawa*, 78 birds on the 15th (D. Gibson); and *Toronto*, 40 birds on the 4th (LeVay).

Twelve localities in MAINE reported grosbeaks in March with females increasing to dominance at *Lewiston* by the 29th and flocks of up to 45 birds (H. Ramsdell). The largest flocks were at *Brunswick*, 70+ on the 22nd (Varney, *Maine Field Observer*, III, No. 4, p. 39); *Warren*, 60 through March (Lord, *op. cit.)*; *York Harbor*, 50 on the 3rd (Drury, *op. cit.)*; and *Skowhegan*, up to 55 birds, (R. E. Bernard). In *NEW HAMPSHIRE* only *Groveton* (M. L. Lehnert), and *Durham* (V. H. Smith), noted grosbeaks in March. Small numbers were seen during the month in VERMONT at *So. Londonderry* (Downs); *Rutland* (E. V. Page); and *Woodstock* (Fillebrown, RNEB). In MASSACHUSETTS fewer reports came in but the distribution remained about the same throughout the state with the largest flocks noted at outer *Cape Cod*, 70+ on the 23rd (Gardler, RNEB); *Pelham*, 60-80 daily (J. Seitz); and *Great Barrington*, 30-100 on the first to the 22nd (E. Hull). At *Adams* and *Northampton* males greatly predominated. In CONNECTICUT G. H. Parks reported from *Hartford* that flocks of 2-35 birds were present on all but one day in March with females predominant on 15 days and sexes equal on 7 days. At *Windsor* M. D. Belden noted daily flocks of 3-30 birds during the month.

In NEW YORK STATE reports came from *E. Setauket*, L. I., with 25 birds noted on the 23rd by A. G. Acheson to *Elmira* with 20-40 birds daily during the month (fide S.H.). Where indicated sexes were equal at *E. Setauket* and males predominated at *Gloversville* and *Nassau*.

The only NEW JERSEY March record came from *Ramsey* where Mrs. Dater observed a few birds daily from the first to the 11th with females predominant on some days but males usually in the majority.

IN PENNSYLVANIA grosbeaks were noted at *Clearfield*, March first to 18th, 25-35 daily (Mrs. J. A. Dague); *Downington*, March first to 25th, small numbers almost daily (Mrs. K. M. Maxwell); *Hollidaysburg*, March 14th to 23rd, birds almost daily (W. J. Moughemer); *State College*, flocks of one to 22 birds on all but two days in March with decline at the end of the month (D. Bordner); and *Sykesville*, 17-102 birds daily with the largest flocks on days of heavy snow, 80 on the 14th, 100+ on the 21st, and 102 on the 29th (Mrs. O. P. Eaton).

A number of VIRGINIA reports for March reported by Paxton, p. 51-52, included: *Charlottesville*, noted; *Chase City*, noted; *Clifton Forge*, birds departed on the 26th; *Courtland*, March 25th, 30; *Elkton*, late March, 6; *Fries*, March first to 15th, 18-20 birds; *Hampden-Sydney*, March 29th, 10; *Harrisonburg*, 12-15 birds seen three times in March; *Hot Springs*, noted; Millboro, March first to 30th, about 100; *Richmond* area, *Washington* area, *Waynesboro*, noted; *Williamsburg*, March 21st, last date seen. Also from *Fork Union* L. J. Wade noted 7 males and 14 females the first week of March.

In NORTH CAROLINA the distribution in March ranged from *New Bern* to *Charlotte* with the largest flocks at *Henderson*, 11 males and 35 females noted on the 2nd by Mrs. A. W. Bachman; and *Southern Pines* where M. K. Wintyen observed from the 6th to the 20th flocks of two to 100 birds on 13 days with 75-100 on the 8th with females predominant. Females also predominated at *Mount Olive* (Mrs. E. W. Holmes). In SOUTH CAROLINA small numbers were seen at *Columbia* and *Dillon* and 60 birds were recorded on the 3rd at *Charleston* with females predominant (fide B.R.C.); near *Witherbee*, 15 were seen on the 8th by E. vonS. Dingle and at Hartsville Mrs. K. G. Kuehner had daily flocks of several hundred from the first to the 9th.

In GEORGIA at *Atlanta* grosbeaks were first spotted in March, and at *Rome* were noted during the month (fide B.R.C.). At *Gadsden*, ALABAMA, Evening Grosbeaks were observed in a wooded residential area from March 2nd to 31st in flocks of one to 18 birds almost daily with males generally predominant (Mrs. B. P. Clark).

At *Edgerton*, OHIO Mrs. G. E. Hopkins reported six males and 14 females on the 2nd and a few birds daily from the 3rd to the 31st.

APRIL

In ONTARIO although the distribution was about the same as in the previous month there was a decline in numbers during April with the largest flocks at *Bolton* (Peel Co.), 30 on the 30th; *Port Credit* (Peel Co.), 35 on the 11th; *Toronto*, 25 on the 5th; and *Rouge Hills* (Ont. Co.), 36 on the 30th. At the latter locality Mrs. Speirs reported seeing on April 15th a female dancing before a male and spreading her tail and swaying.

In MAINE although at *Skowhegan* in April there was an increase in birds to 55 (R. E. Bernard), in most areas there was a decline from a maximum of 20-50 birds during the month. In NEW HAMPSHIRE grosbeaks were seen at *Plymouth* and *Durham* and at *Hanover* on the 11th twenty birds were seen eating buds or catkins of aspen by H. C. McDade. In VERMONT small numbers were observed at *Bennington* (fide S.H.) and *Woodstock* (Fillebrown, RNEB); at *Bradford* thirty were counted on the 23rd (fide Macdonalds); at *Rutland* 20-21 birds were seen April first to 7th (E. V. Page); and 20-40 appeared daily during the month at *So. Londonderry* (Downs).

Twenty-one localities in MASSACHUSETTS from *North Chatham* on Cape Cod to *Adams* in the Berkshires reported flocks of a few individuals to about 80 birds April 3rd at *Middleboro* (D. Briggs). At *Adams* F. Brierley observed April first to 16th, 45-50 birds with 80% males; April 17th to 30th, 30-35 birds daily with males predominant although the females gradually increased; April 14th a female was seen spreading her tail and bobbing her head at a male; April 27th a male was observed twice fluttering his wings with head and tail up. At *Northampton*, April 19th, a female spread her tail and danced and a male bobbed his head; April 20th a pair bobbed heads on the feeder; and on the 24th a male courted a female by vigorous fluttering of wings with crest raised and tail in the air (M. Shaub).

At *Hartford*, CONNECTICUT, flocks of two to 34 birds were seen on 29 days in April with females predominant but an increase in the proportion of males occurred April 22nd to 30th (Parks). At *Windsor* on April 29th the five birds present were the last seen this year (M. D. Belden).

In NEW YORK STATE seven localities from *E. Chatham* to *Corning* reported a few birds to about 100 daily with males predominant 4:1 at *Gloversville* (Mrs. O. Slade).

In PENNSYLVANIA small flocks were seen in April at *State College*, *Hollidaysburg* and *Altoona*, a large flock April 10th at *Ligonier* (fide W. J. Moughemer) and at *Sykesville* during the month daily flocks of 27-73 the first half of the month with a decline the second half to 16 birds on April 30th with males usually predominant where indicated (Mrs. O. P. Eaton).

At *Salisbury*, MARYLAND, eight grosbeaks were observed on the 20th by Mrs. A. Bergstrom.

As in previous years the peak month for VIRGINIA was April in most localities: *Arlington*, April 12th, first date seen, about 10 birds present with females predominant 2:1; April 19th a male displayed before a female with head back and breast almost touching the feeding tray he vibrated his full-spread wings; April 21st to 30th about 15-20 birds daily (A. H. Fast); *Fredericksburg*, a few birds on the 23rd and at *Jamestown* several noted on the 22nd (Mrs. A. Bergstrom); *Wilmington*, 15 pairs on the 25th (L. J. Wade). Paxton, p. 51-52, recorded the following: *Charlottesville*, noted in April with a maximum of 12 on the 30th; *Chase City*, noted April first to 13th; *Hot Springs*, 76 on the 18th; *Lexington*, noted April 20th to 30th; *Millboro*, about 100 April first to 12th; *Sweet Briar* noted in April; *Washington* area and *Waynesboro* noted in April.

In NORTH CAROLINA localities from *New Bern* to *Charlotte* reported flocks of varying size with the largest numbers at *Greensboro*, 24 (Mrs. C. Breckenridge) and *No. Wilkesboro*, approximately 50 on the 23rd (W. P. Smith). In SOUTH CAROLINA at *Charleston* from April first to 15th up to 70 birds were present with 20% males, the males departing on the 25th, the females on May 2nd (Dr. J. Cavanagh, Jr.); *Hartsville*, decline in flock size with the last ones, a pair, noted on the 24th (Mrs. K. Kuehner).

In GEORGIA grosbeaks were seen frequently during April at *Eatonton* and last noted at *Atlanta*, 3 birds on the 27th (fide B.R.C.). In ALABAMA at *Gadsden* a few birds were seen almost daily April first to 12th with a peak of 15 on the 4th and one male was the last seen on the 23rd (Mrs. B. Clark);

Livingston, about 15 feeding on ash trees on the 10th (fide Mrs. Clark); *Randolph Co.*, near the Georgia line, one male on the 10th (fide Mrs. Clark); and *Wedowee*, one male on the 10th (fide Mrs. Clark).

At *Edgerton*, OHIO, a few grosbeaks were observed in early April by Mrs. G. E. Hopkins and at *Armstrong Creek*, WISCONSIN, eight birds were noted on the 20th by R. A. Stefanski.

MAY

At *Wolfville*, NOVA SCOTIA, three males and two females were still present May 28th (R. W. Tufts). Reporting for NEW BRUNSWICK, W. A. Squires wrote in *Nature News*, Vol. 9, No. 3, May-June 1958, p. 2, "Evening Grosbeaks which were scarce in the Province all winter returned in the middle of May in great numbers to breed. There were many in the *Fredericton* area for several weeks. I saw at least 100 there on May 22nd." In northern NEW BRUNSWICK grosbeaks were reported May 24th and on June 2nd two were seen near *Saint John* (W. A. Squires). There was a definite decline in ONTARIO in numbers of birds and in areas still having grosbeaks in May with only 9 localities reporting. Departure dates included: Nipissing Dist., *W. Ferris*, May 25th; Ont. Co., *Cherrywood*, the 18th and *Rouge Hills*, the 18th; Peel Co., *Port Credit*, the 27th; Temiskaming Dist., *New Liskeard*, the 14th; Wentworth Co., *Hamilton*, the 18th (Ont. reports fide D. Speirs).

In MAINE grosbeaks were last noted in May at *Lewiston* on the 4th (H. Ramsdell) and as indicated in the *Maine Field Observer*, III, No. 6, 1958, p. 65: *Bar Harbor*, one bird the 30th (Craney); *Brunswick*, one bird the 22nd (Varney); *Castine*, 20 on the 31st (M. C. Morse); *Cumberland Mills*, 63 on the 16th (Werner); *Harrington*, two on the 30th (Bigelow); *Matinicus Island*, two on the 21st (Bucheister); *So. Berwick*, one bird on the 18th (Libbey); *Wilton*, four on the 31st (Fernalds). At *Brewer* (Clish), *Kokadjo* (Sherman), and *Skowhegan* (Bernard) grosbeaks were seen into June indicating probable nesting in these areas.

In NEW HAMPSHIRE the picture was quite different. With the exception of *Pittsburg* where grosbeaks were observed in several fair-sized flocks in May and also during the summer (Fred Scott) the other areas that had grosbeaks during May did not have these birds after that. The last dates seen were: *Bedford*, one bird on the 23rd (J. H. Kennard); *Campton*, one male on the 24th (G. E. Davis); *Durham*, the 20th (V. H. Smith); *Groveton*, the 12th (Mrs. William Lehnert); *Hanover*, the 19th (McDade); *Lebanon*, the 20th (fide Mrs. K. Churchill); *Melvin Village*, 10 on the 6th (Mrs. A. Foote); *Peterboro*, the 22nd (Mrs. W. Brown).

In VERMONT Evening Grosbeaks departed from *Topsham* May 22nd (Macdonalds) but birds remained through the month and into June at *So. Londonderry* (Downs), *Waterbury* (L. Squier), and *Woodstock* (T. Fillebrown).

MASSACHUSETTS departure dates included: *Bedford*, May 13th (E. Wade); *Cambridge*, May 12th, 2 birds (H. T. Wiggin); *Great Barrington*, 3 pairs on the 14th (E. Hull); *Middleboro*, May 23rd (D. Briggs); *Northampton*, a pair on the 29th (J. Watrous); *Pelham*, one male on June 6th (Seitz); *Somerset*, one male June 6th (A. M. Blackledge). The heavy concentrations in *Adams* during May with males predominant brought 55-60 birds on the first and 30-35 daily May 2nd to 4th followed by the departure date of May 23rd despite the courtship activity during the last two weeks of their stay and actual mating on May 18th, all indicating a potential nesting area. However, neither nests nor very young birds were found here (F. Brierley).

Last reports from CONNECTICUT were *Cos Cob*, May 16th (Mrs. M. S. Roesler); *Hartford*, the 17th (Parks); and *Norwichtown*, the 3rd (Mrs. H. Knup).

Later departure dates were indicated in NEW YORK STATE: *Amsterdam*, June first (M. Fitzgerald); *Cazenovia*, May 27th (fide S.H.); *E. Chatham*, the 11th (E. Radke); *E. Setauket*, L. I., the 23rd (A. G. Acheson); *Etna*, the 25th (S. Hoyt); *Glens Falls*, June first (I. B. Sauter); *Gloversville*, May 17th (B. Slade); *Hornell*, the 26th (W. Groesbeck); *Ithaca*, the 24th (fide S.H.); *Nassau*, the 18th (E. Turner); *Oriskany*, the 16th (K. Worden, fide S.H.); *Pen Yan*, the 20th (fide S.H.); *Rome*, the 23rd (fide S.H.). At *Piseco* about the last of May the major number of birds departed, leaving two or three mated pairs (R. Christie, Jr.).

Departure dates in PENNSYLVANIA included: *Altoona*, May first (fide W. J. Moughemer); *Hawk Mt.*, the 19th (M. Broun); *Hollidaysburg*, the 4th (W. J. Moughemer); *Rush*, the 10th (Mrs. E. McCain, fide S.H.); *State College*, the 17th (D. Bordner); *Sykesville*, the 15th (Mrs. O. P. Eaton); *Wellsboro*, the 16th (fide S.H.).

Southern departure dates were earlier as might be expected: *Laurel*, MARYLAND, May 5th (fide E. Downs); in NORTH CAROLINA—*Greensboro*, the 6th (Mrs. C. E. Breckenridge); *Henderson*, the 6th (Mrs. A. W. Bachman); *Southern Pines*, the 5th (fide M. K. Wintyen). Additional departure dates from NORTH CAROLINA (fide B.R.C.) included: *Charlotte*, May 4th (Mrs. H. B. Wellford); *Durham*, the 3rd (Mrs. G. C. Pyne, Jr.); *Elkin*, the 14th (L. Hendren); *New Bern*, the 15th (F. D. Conderman); *No. Wilkesboro*, the 2nd (W. P. Smith). Dr. J. E. Cavanagh, Jr., last observed grosbeaks at *Charleston*, SOUTH CAROLINA, on May 2nd. Mr. Chamberlain also reported from *Eatonton*, GEORGIA, the departure date as May 2nd when a pair was observed by F. W. Fitch, Jr.

In VIRGINIA the departure dates included: *Arlington*, May 14th (A. H. Fast); *Charlottesville*, the first; *Lexington*, the 3rd; *Sweet Briar*, the 7th; *Waynesboro*, the 12th (Paxton, p. 52).

From MICHIGAN last reports were *Muskegon*, May 12th (Mrs. H. W. Clover); and *West Branch*, the 2nd (Mrs. Caroll Martin).

In WISCONSIN at *Armstrong Creek* the peak of the migration was May 4th and the last bird noted May 11th (R. A. Stefanski) while at *Mishicot* the departure date was May 13th (B. Brouchard).

The Evening Grosbeak situation in QUEBEC followed a different pattern from that farther south. Here the birds were reported from only 16 localities during the winter with indications of scarcity in the *Quebec City* region where noticeable waves of migration occurred from May 18th to 25th. The species was more abundant in southern QUEBEC in the *Rigaud* region with 200 birds noted here Sept. 29th and Oct. 1st to 3rd by Rev. L. Genest and 200 grosbeaks observed at *Charlesbourg* by H. Ouellet on May 19th.

CONCLUSION

The Evening Grosbeak incursion for 1957-58 was significant in many respects. The season began early with heavy movements in Northern New England the first week of September, wide distribution of the species in most of New England by early October, fairly wide scattering in New York State by October 22nd. Pennsylvania was well represented by the end of October and during the month there were reports from a number of Maryland localities with the Evening Grosbeak arrival date in this state broken on October 12th at Monkton, Baltimore Co. By the end of the month the Evening Grosbeak was reported from Virginia and North Carolina.

Before the season was over, the wintering range of the Eastern Evening Grosbeak as reported to the author extended from Baddeck, Nova Scotia, on the east across southern New Brunswick and northern Maine, across the St. Lawrence River to Kenogami on the Saguenay River, then south to the Montreal area and west to the Ottawa region. The northern delineation of the wintering ground then extended northwest to New Liskeard in the Temiskaming District, northwest to the Thunder Bay District north of Lake Superior and south to Armstrong Creek in northeastern Wisconsin. The line then extended south to the Chicago area, southeast to central Ohio, then to western Tennessee and Gadsden, Alabama. The southern delineation of the wintering ground was a line from Gadsden to Rome, Georgia to Charleston, South Carolina, the latter locality being the southernmost penetration of the species this winter.

As might have been expected the withdrawal to the north began earlier

in the South with the birds last seen at Charleston May 2nd and North Carolina departure dates ranged from May 2nd to 15th. Virginia departure dates ranged from March 21st to May 14th, Pennsylvania from May 1st to 19th, and New York State from May 11th to June 1st. New England last dates were April 29th to May 17th for Connecticut, May 12th to June 6th for Massachusetts, May 22nd for Vermont, May 6th to 24th for New Hampshire, and May 4th to 31st for Maine. In southern Ontario the departure dates ranged from May 14th to 27th. However, in New Brunswick the picture was very different with grosbeaks scarce in the Province all winter but returning in the middle of May in great numbers to breed.

As noted in past years the female grosbeaks tended to penetrate more deeply into the wintering grounds than the males. Flock sizes were variable over the winter range from a few birds to over 100 with the largest numbers noted in various areas. Banding was carried on at a number of stations, 31 of which reported to us a total of 7,152 grosbeaks banded during the winter of 1957-58. Undoubtedly more were banded and these records sent to the Banding Office. However, in comparison with other years it is interesting to note that since 1950 this is the 4th highest total for one winter season, the record being 12,404 birds banded in 1955-56 by 33 stations. The number of late departure dates and the several reports of courting seemed to indicate an extension of the summer range and we can look for more widespread summer records in the future.

159 Elm Street, Northampton, Mass.

THE DESTRUCTION OF NEARLY ONE HUNDRED EVENING GROSBEAKS AT ST. LEON le GRAND, QUEBEC*

BY B. M. SHAUB

Our research station receives from the Bird-banding Office of the U. S. Fish and Wildlife Service, from time to time, reports on the activities of bird-banders and others who supply information concerning the Evening Grosbeak *(Hesperiphona vespertina)*. During the latter part of 1959 and in January of 1960, we received some startling reports concerning the collecting of large numbers of Evening Grosbeaks in Rimouski County, Quebec. On the 15th of February I wrote to the collector asking for information concerning the birds he had collected and which were banded at our station. Not ever expecting to hear from him, I was astonished at receiving a reply in less than a week. While he refers to himself as a "French Canuck" and states that English is not his language, his letter is in an excellent hand writing, far better than that of most of the students in the college where I taught. In his letter he frankly related the facts concerning his activities in collecting the Evening Grosbeak in his vicinity. He wrote that the "first one was killed by my cat and I showed that to my American fisherman and he told me to go ahead and get all I can to cooperate with the U. S. Wildlife Service.

*Contribution Number 25 from the Shaub Ornithological Research Station, Northampton, Massachusetts.

I did (not) know they were protected, now I know because some have reported me and I am fined. Now on I will not kill any more my curiosity is finish. Those birds stay all winter and summer here; they hang on the thick spruce. During last summer they were thicker than before. It is only 3 summers that I notice that kind of Evening Grosbeak."

Here we can clearly see that the killing of a large number of Evening Grosbeaks, at least 94, was the direct result of a vociferous American speaking out of turn and without knowledge or authority and thereby directly influencing the actions of an otherwise innocent man so as to cause him to be arrested and fined for violating a law unknown to him and at the same time to bring about the destruction of some ninety birds.

In a subsequent letter dated March 19, 1960, Mr. Brousseau throws much additional light on the manner in which the Evening Grosbeaks were collected. With the exception of the addition of a few punctuations and capital letters at the beginning of sentences his picturesque English follows: "I'll try to answer all your questions. The sport that told me to kill the birds, they have shot some themselfe event one ladie have shot one and they have taken the band along with them. Myself I have not shot more that 15 all others have been shot by sports, but me I take the responsibility to send them to Washington. There is a lot of peoples that have shots some and will never be reported. My friend on Kedgewick River done the same. It happen to call me over the telephone and say that he kill yellow birds with Band on. He ask me if I would report them for his so I did. I have 42 reports from Laurel. The distance between the two camps on River it 11 miles. But my dear Sir there is lots of you bird that never will be reported because the Govt. and Company that hold timber Limite they have sprayed DDT for the Bud Worm for two summer and along the road we have found lots of dead birds event longside the river we have found lots of fish dead the last summer that they spray they had order to shut off longside River and Lake. I believe the biggest lost it was among the Black Capped Chicke. We have shot the bird with rifle 22 only the one with band on." - - - -

"About the fine I'll take my medicine like a man but it will be a sure cure for me. It don't take much to put yourself in trouble. There is an old saying that you don't go to war without lossing any feathers. I am going on the river again next summer but believe me I will leave the nice little birds alone because they are cute and don't do no harm. It lively to have them around you camp."

It is regrettable that hunters and fishermen who look upon themselves as, and want to be known as, fine sportsmen and live by all the rules when they are in good company, however they are so often actually the opposite especially when they are out in the great out-of-doors. Instead of enjoying the natural beauty around them they become killers like the cats, those arch killers of wild life; they want to get their "paws" on the beautiful living things and to do so they use firearms or other weapons of destruction. Not only the male "sports" become killers but at least one female of the same species has reverted to the killer state and for her trophy she took home the leg band which identified the bird.

Mr. Brousseau, especially, has my sympathy for the unforeseen trouble that came his way for believing the information given him by one of his

"sports." The censure should have included first and more justly the instigator of the collecting program and the others who so freely contributed to the destruction of the many beautiful Evening Grosbeaks. We hope that Mr. Brousseau finds his woodland friends as cheerful and lively about his future camps as they have been in the past.

Now that we have exonerated the collectors Messrs. Thomas Brousseau and Paul Boulanger of St. Leon le Grand, Quebec, we should look carefully at the data provided by this wildly irregular endeavor at cooperation. The data supplied are most unusual and have no equal concerning the Evening Grosbeak, or possibly any other bird that has been banded in numbers and collected during its breeding season.

For a period extending over 49 days from the 22nd of June to the 9th of August inclusive, 1959, the 94 banded birds were collected on

Fig. 1. Outline map giving location of St. Leon le Grand, Quebec and the localities where the Evening Grosbeaks were banded.

their nesting grounds. These birds were banded at 47 localities, Fig. 1, in the northeastern part of the United States and two localities in Canada. The banding localities and the number of birds banded at each and collected at St. Leon le Grand, Quebec, are as follows: Adams, Mass. (1); Amsterdam, N. Y. (5); Athens, Pa. (1); Battle Creek, Mich. (1); Bedford, N. H. (2); Bennington, Vt. (1); Berwick, Pa. (1); Bethel, Vt. (1); Bloomfield, Conn. (1); Bowdoinham, Me. (1); Burlington, Vt. (3); Candia, N. H. (1); Conway, Mass. (2); Cumberland, Me. (2); Deposit, N. Y. (6); East Chatham, N. Y. (3); East Greenwich, R. I. (1); Franklin, N. H. (1); Freeland, Pa. (2); Hanover, N. H. (2); Hartford, Conn. (2); Hawk Mtn. Sanctuary, Kempton, Pa. (2); Kingston, N. Y. (1); Lambertville, N. J. (1); Ledyard, Conn. (4); Lewiston, Me. (1); Lexington, Mass. (4); Mansfield, Conn. (1); Middleboro, Mass. (1); Midland, Mich. (1); Montoursville, Pa. (1); New Hampton, N. H. (1); Northampton, Mass. (2); Oneida, N. Y. (1); Ottawa, Ont. (1); Reading, Mass. (2); Richmond, Va. (1); Rye Beach, N. H. (1); Saxton River, Vt. (1); South Hamilton, Mass. (2); South Londonderry, Vt. (3); State College, Pa. (7); Storrs, Conn. (2); Syracuse, N. Y. (1); Toronto, Ont. (1); Ware, Mass. (6); Watertown, N. Y. (1); Weston, Mass. (1); Wolfeboro, N. H. (3).

In checking the reports one finds some indications that there was considerable flock cohesion for such small numbers accounted for from the various stations. The unusual factor is not that they were banded on or near the same day but that they were taken on the same day at St. Leon le Grand, Quebec from the same banding locality. For example

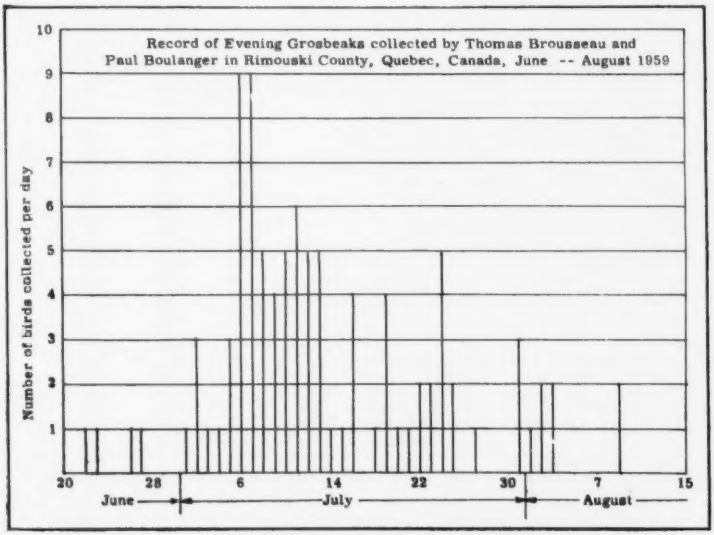

Fig. 2. Diagram showing date and number of Evening Grosbeaks collected from June 22nd through August 9th, 1959, in the vicinity of St. Leon le Grand.

on July 6th two birds, both males banded at Amsterdam, N. Y., one banded in 1956 while the other was banded in 1958, were taken. On July 6th also, three birds, all males, were taken that were banded at Deposit, N. Y. in January and February 1959. On the next day two more birds banded at Deposit, N. Y. were taken, one a male, the other a female; both were banded in 1958. On the 8th of July, two birds banded at Reading, Mass. were taken. These were both females, one banded in 1956, the other in 1959. Two birds, a male and a female, banded at Freeland, Pa. in March, 1959 were taken on July 10th. In a few other instances birds from the same station were taken on the same day or within a day or two of each other.

Of the 94 Evening Grosbeaks involved in the reports received from the U. S. Fish and Wildlife Service, 66 were reported as collected by Thomas Brousseau, R. R. No. 1, St. Leon le Grand, Quebec and taken on the west branch of the Patapedia River in Rimouski County and 28 were reported as having been collected by Paul Boulanger, R. R. No. 1, St. Leon le Grand, Quebec on the north branch of the Kedgewick River in Rimouski County, Quebec, Canada. These rivers flow south and east to enter the Restigouche River which separates in part the Gaspe Peninsula and New Brunswick. We have received reports from residents of New Brunswick over the past decade that numerous gros-

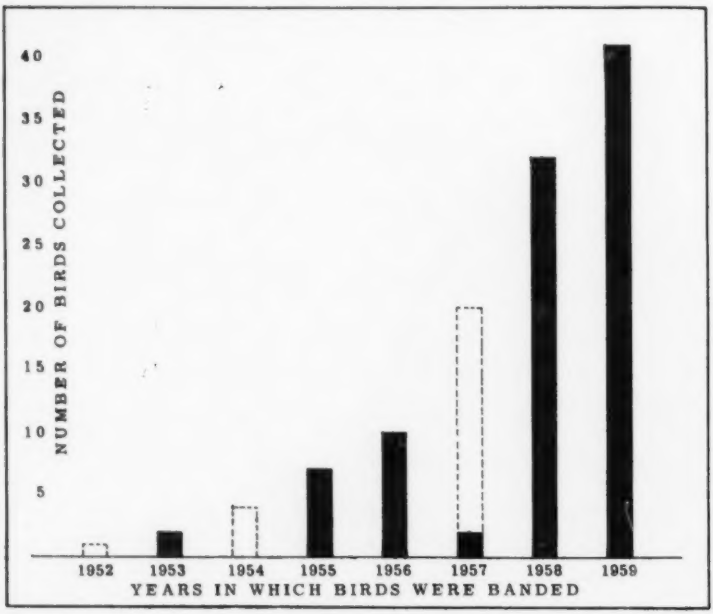

Fig. 3. A survival chart showing the number of birds in the sample plotted against the years in which they were banded.

beaks have been encountered during the summer in the Restigouche River area, hence the collecting of nearly a hundred Evening Grosbeaks in this general area during the summer of 1959 is not at all surprising. It now appears that the forest areas of the Gaspe, Northern Maine and New Brunswick have become the general breeding grounds for at least a considerable part of our Evening Grosbeak population which migrates southwesterly into the New England and portions of the Middle Atlantic states, especially along their more mountainous and rugged areas.

The rather rugged physiographic and wooded nature of the terrain in the northern part of Maine and the parts of adjoining Canada, together with suitable food possibilities for rearing their families, have been the deciding factors in encouraging these birds to select the area as a breeding territory. The adoption of this area appears to have been made within the past decade and possibly during the latter half of this period as Mr. Brousseau states that he only noticed the birds three years ago. In his second letter, see below, he mentions the presence of bud worms which may have had some influence on the area being selected for nesting. The smaller populations of these birds may go unnoticed for years. That such a situation is not only a real possibility but rather a probable one is the fact that during the past two autumns, while examining mineral localities and also while hunting in western Maine, I very frequently observed these birds and for periods it was a daily occurrence to see or hear flocks of Evening Grosbeaks which were completely unnoticed by my companions. Hence it is difficult to fix a given year as the actual date when a limited number of Evening Grosbeaks first accepted the area as an important breeding ground for the species.

It is interesting to note from Fig. 2 that the geratest number of birds were taken during the first two weeks of July, which is probably the time, or near the time, when the fledglings are already away from the nest or at least close to the time when they are fully feathered. During this period the adults are most actively gathering food and feeding the young. They would be far more likely to come around residences, where food is probably easier to find than in the dense spruce and evergreen forests. It would therefore be much easier to collect the adults, all other factors being equal. It appears that the same phase of the nesting cycle of the Evening Grosbeak at Saranac Lake, N. Y. and at South Londonderry in Vermont comes about two weeks earlier, from the records obtained by banders at these localities. Of course after a considerable number of adults were removed, as during the first two weeks of July, the numbers available for further collecting undoubtedly would be substantially reduced and a situation of diminishing returns would develop. Again the pressure of collecting may have diminished also. On the other hand the adults and the juvenals, as the latter became more mature, would be more wary and would no doubt search out greater seclusion in the more forested areas where they would not be as easily found and become targets for collectors.

The sex ratio of the birds collected and reported by the U. S. Fish and Wildlife Service is 53 males and 41 females. While this ratio shows that about 25 per cent more males than females were collected, it may be the result of one or more of several factors. If the adults were taken during the first few weeks after the young left the nest the males would

be more vulnerable for they do most of the feeding of the young during this time and up until the juvenals shift for themselves. The males are also much more conspicuous and may have been singled out from the females and juvenals, which went by unnoticed. Another factor may be that during the banding seasons of the first four months of 1958 and the like period of 1959 there were considerably more males banded than females as the flock composition in the banding areas is known to vary considerably from year to year.

In looking at the data concerning the 94 birds collected one may correctly view them as a random sample, although much too small for the probable Evening Grosbeak population in the northeastern United States and the adjoining area of eastern Canada. In Fig. 3, I have plotted the number of birds collected against the year in which they were banded. From this graph we see that the oldest birds were banded in 1953 making them at least 6 years old; they could be seven or eight or more years old for they could have been two or more years old when they were banded. None of the birds collected were banded in 1954 and only two were banded in 1957. During 1954 and 1957, the incursions of grosbeaks into the populous bird-banding area of northeastern United States were low in numbers of birds present and numbers banded, hence the number collected from these years should show a much lower number present in the sample. The dotted portion shows the approximate number of birds that one would expect to find in the sample collected had a proportional number of birds been banded during these years. Such a lack of birds for 1954 and 1957 could also indicate that during these years there may have been proportionally a smaller number of young birds surviving the nesting season, possibly due to adverse weather conditions or other causes such as possible widespread DDT spraying for insect control in the Evening Grosbeak nesting areas.

For the size of the estimated Evening Grosbeak population in the northeastern part of the United States and the adjoining provinces of Canada, one should have a sample approximately 8 to 10 times the number of birds collected by Brousseau and Boulanger. Such a sample would raise the height of the curve, Fig. 3, 8 to 10 times and extend it 3 to 4 places to the left where the oldest birds would appear. From such a sample one would expect the graph to show that one or more Evening Grosbeaks would appear with 9 to 10 summers behind them and the birds would be very, very old ones. Such an age would probably be reached by only a few birds and rarely if ever would a bird reach a dozen years in age.

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GENERAL NOTES

A Modified Fair Isle Apparatus for Collecting Bird Ecto-Parasites.[1] One of the problems confronting the "would-be" collector of bird ecto-parasites is an efficient means of collecting specimens. Williamson (1954) described a collecting apparatus as follows: ". . . there is a strong plastic cylinder, open at both ends, its base resting on a white porcelain tile on the laboratory bench. Attached to the cylinder by spring clips on the opposite sides are narrow glass bottles in which the chloroform is contained. Air is supplied by compressing a rubber bulb which is connected to the bottles by short lengths of rubber tubing terminating in glass inlet tubes . . . whose ends are of sintered glass and reach below the surface of the liquid. The resulting vapour is forced into the cylinder via the small outlet tubes. . . . As formerly a cape of oiled silk is used to close the top of the cylinder and protect the bird's head. Treatment should last for a minute or so, but it may have to be prolonged slightly if the bird cannot be induced to flutter."

Such an apparatus, with minor modifications, was constructed in 1956. A plastic cylinder, 10 inches long and 8 inches in diameter, with ¼ inch walls was used. On opposite sides, about 3 inches from the top, ¼ inch holes were drilled. The arm of a ¾ inch side-arm test-tube, which was held to the side of the cylinder by spring clips, was pushed through each hole. A one-hole rubber stopper, fitted with a glass tube reaching almost to the bottom of the test-tube, was placed in the top of each test-tube. An "airstone," similar to those used in an aquarium, made of pumice stone was fitted on the bottom of these tubes. The tubes were connected by rubber tubing, and a Y connector, to a Politzer bag and a rubber bulb. The lid consists of 2 circles of ¼ inch plastic, 8 and 7½ inches in diameter. A 4 inch circle was cut in the centre of each. A piece of sheet rubber, about 5 inches square, was placed between these. The 2 pieces of the lid are bolted together with five 1 inch by ⅛ inch bolts. A small slit, about 1½ inches long, is made in the rubber. The bird's head is pushed through this, supported by the first and second fingers of the operator's left hand.

To use the apparatus the test-tubes are partially filled with chloroform and the rubber bulb is squeezed a few times, inflating the Politzer bag. The air in the Politzer bag slowly bubbles through the chloroform, evaporating some of it. This vapour soon fills the cylinder. Usually it is necessary to keep the air bubbling through for 1 or 2 minutes. The bird is encouraged to flutter and usually the parasites may be seen dropping onto the white plastic below. If a number of birds are to be treated, 8 inch filter paper has been used on the bottom of the cylinder. This may be examined by another operator while the cylinder is moved down the bench to treat another bird.

The apparatus was used in the spring and fall of 1956 with encouraging results. However, the chloroform fumes were unpleasant to the operator and were sometimes hard on the bird. Also the chloroform sometimes spilled, and damaged the plastic cylinder and connectors. After some tests the most practical substitute seemed to be carbon dioxide gas under pressure. The apparatus had to be modified accordingly. The test-tubes, "air-stones," Politzer bag and rubber bulb were no longer needed. Instead a piece of ¼ inch plastic tubing was inserted in each of the holes in the cylinder. Rubber tubing and a Y connected these with a cylinder of carbon dioxide gas. Now it is simply a matter of turning a valve to fill the plastic cylinder with gas. Treatment takes a little longer by this method—2 to 4 minutes—but it is much more convenient.

Parasites, except bird-flys (Hippoboscidae), may be preserved in 80% alcohol. Specimens from each bird should be kept separate and have a label containing the name of the bird, date, place and collector associated with them. Bird-flys should be kept dry and mounted on insect pins. A squat pint jar containing vials, ¼ by 2 inches, and filled with 80% alcohol is a convenient field storage method. As each vial is used some absorbent cotton may be shoved in the mouth of the vial to seal it. Some people use a hand lens to spot the parasites and the white plastic or the filter paper. It is advisable to put each bird to be examined for ecto-parasites in a bag as soon as it is taken from the net or trap, as the bird-flys may fly off the bird when it is being handled.

[1]Contribution no. 5 of the Point Pelee Bird Banding Station of the Ontario Bird Banding Association.

The Federation of Ontario Naturalists provided financial support for this project.

REFERENCE

WILLIAMSON, K. 1954. The Fair Isle apparatus for collecting bird ecto-parasites. *British Birds*, **47**: 234-5.—James Woodford, and Frank T. Lovesy, Royal Ontario Museum, Toronto 5, Ontario and 220 Gowan Ave., Toronto 7, Ontario.

Whip-poor-will *(Caprimulgus carolinensis)* Netted; Band Size—Three of these birds have been taken in mist nets so far this spring (1960). Two were netted between 8:30 and 9:00 p.m. on April 5 and 9 which at this season and latitude is after dusk has fallen but prior to full darkness. The third was in a net at first inspection just after dawn (5:30 p.m., May 11). Size 3 bands, as recommended by the Fish and Wildlife Service, are too large, sliding off over the toes. A size 2 band is satisfactory. The tarsal diameter of all three birds was 4 mm.—R. O. Bender, Cobbis Mill Road, Bridgeton, N. J.

Deformed bills—Catbird *(Dumetella carolinensis)*—On Sept. 12, 1959, a Catbird taken in a mist net was observed to have a very abnormal upper mandible which extended 5 mm beyond the end of the lower mandible. The terminal 5 mm was bent downward in a decided hook, the top of which was 4 mm below the under surface of the lower mandible. This bird, 56-127996, weighed 34.3 gms, which may be a trifle low for a fall bird, yet it appeared to be in good condition. It was seen in the vicinity three times in the succeeding four days. A careful examination did not disclose any indication of an injury, hence it seems possible that the deformed bill was the result of a mutation.

Catbird 59-174207 appeared to have suffered a broken upper mandible at some previous time. The apparent break, about 8 mm from the feathers, had healed, but had left a raised area across the bill about 2 mm in height. When this bird took my finger in its bill, the upper mandible bent very noticeably at the point of the presumed break. The bird weighed a normal 36.7 gms.

Blue Jay *(Cyanocitta cristata)* 553-27368, taken in a clover-leaf trap on March 5, 1960, had an upper mandible 4 mm shorter than the lower which was very thin right out to the tip where there was a bulge which did not resemble a normal tip. No evidence of recent injury could be observed, but the irregular surface of the thin section suggested a previous injury. The bird was rather light, 81.0 gms, but occasionally other individuals with normal bills have been weighed at as low as 76.2 gms.—R. O. Bender, Cobb's Mill Road, Bridgeton, N. J.

RECENT LITERATURE

BANDING

1. Recoveries of Ringed Birds. Mediterranean Islands. Wladyslaw Rydzewski. 1960. *Rivista Italiana di Ornitologia*, **30** (Series 2): 1-77. In publishing this carefully and laboriously assembled compilation of banding data, the editor and founder of the *Ring* has performed another great service to banding and to ornithology. Here are listed with available data the Mediterranean island recoveries reported to date from the some 36 ringing schemes in Europe. With the exception of a few annual lists of "recoveries of foreign bandings" published by several European countries, and a few analyses of waterfowl recoveries by states and by "flyways" published in this country, practically all recovery data have been published according to place of banding. I hope that the value of this pilot assemblage from the recovery locality standpoint will encourage the publication of similar compilations for other well defined geographical regions. Students of faunistics and distribution have heretofore largely neglected these valuable data because of the difficulty of finding and assembling them from the widely scattered literature. A similar breakdown of recoveries from various parts of Africa would be most useful, and in this country a compilation by islands of the rapidly mounting recoveries from the West Indies, now reposing quietly in the Patuxent files, would well repay someone's efforts to dig them out, sort them, and publish them.—O. L. Austin, Jr.

2. Report on Bird Ringing for 1958. Robert Spencer. 1959. *British Birds*, **52**, Supplement: 441-482. "In 1958 the ringing scheme reached two milestones: for the first time 200,000 birds were ringed in a year, and the grand total since 1909 passed the two million mark." The use of mist nets is resulting in a decided increase of numbers of birds ringed. The 1958 ringing total was 200,835 birds, and during this year more than 6,300 recoveries were reported; these include "recaptures by other than the ringer at any distance and local recoveries of dead birds." Thirty-two pages are devoted to a "Selected List of Recoveries" of which perhaps the most striking relates the fate of 4 out of 5 Kestrels *(Falco tinnunculus)* from the same brood, all of which were shot or found dead the following winter—one 14 miles west, one 85 miles south southeast, one 285 miles south southwest, and one 380 miles south southeast.—M. M. Nice.

3. British Recoveries of Birds Ringed Abroad. E. P. Leach. 1959. *British Birds*, **52** (Supplement): 482-492. The most amazing record is that of a Curlew *(Numenius arquata)* ringed in Finland as a chick 6 June 1926 and shot in Norfolk 15 January 1958—in its 32nd year. Careful investigation was made with the Museum authorities at Gothenburg; fortunately the ring was saved. A juvenile Mute Swan *(Cygnus olor)*, ringed in Lithuania was found dead in Dumfries, Scotland 4 years later. "A Great Tit ringed in Germany and Blue Tits marked there and in Belgium, all as juveniles during May-July 1957, are interesting as defining points of origin of the remarkable tit irruption of that autumn. . . . Once again there is unwelcome evidence of a mass influx of foreign Great Black-backed Gulls, this time from Russia as well as Iceland and Norway, the immigrants being widely spread over the British Isles." The whole report is of great interest.—M. M. Nice.

4. Activities at the Ottenby Bird Station 1958. Report No. 25. (Verksamheten vid Ottenby fågelstation 1958.) Bengt Danielson. 1959. *Vår Fågelvärld*, **18**: 249-279. (English summary.) The 1958 season, during which continuous observations and banding were carried out from 14 April to 2 November, is described as the station's most successful year, yielding a "rich harvest" of returns and recoveries. Actual results were: 16,983 new birds banded, 217 birds banded at Ottenby recovered, and 9 foreign recoveries trapped and released. Practically all birds banded after 1 July were weighed and measurements were taken of certain species. Irruptions of Green Woodpeckers *(Picus canus)* in August, Redpolls *(Carduelis flammea)* in June-July, and Crossbills *(Loxia curvirostra)* in early July, apparently originated in the east since similar movements were also noted in Estonia. In mid-July a remarkable wave of southbound migrants, mostly Lapwings *(Vanellus vanellus)* and small shore-birds, followed upon the passage of an unusually intense storm which developed over central Sweden.—Louise de K. Lawrence.

5. Banding White Pelicans at Anaho National Wildlife Refuge, Nevada. Eugene Kridler. 1960. *News from the Bird-Banders*, **35**: 5-6 (including map of recoveries). Recoveries are concentrated along the west coast of Mexico in the states of Sinaloa, Nayarit and Michoacan. Only one bird was recovered on the Gulf of Mexico.—E. Alexander Bergstrom.

6. Recoveries of Robins Banded at Oakland, California. Howard L. Cogswell. 1960. *News from the Bird-Banders*, **35**: 7-9. During the winter of 1957-58, 444 Robins *(Turdus migratorius)* were banded in Oakland, from a winter roost of about 30,000 birds. By the end of the following summer, 15 had been recorded at distances of one mile or more away. Apparently both local birds and winter residents from the north used the roost.—E. Alexander Bergstrom.

7. A Method for Proper Determination of Band Sizes in North American Birds. Don Bleitz. 1960. *News from the Bird-Banders*, **35**: 1-2 (one illustration). A gauge similar to a wire gauge, with each slot representing the exact inside diameter of one band size, permits the gathering of information on the number of individuals of a species which take each size of band (at exact measurements). This is essentially the Michener gauge (see *Bird-Banding*, **18**: 77-79), but seems to have been reinvented independently. It is a "go-no go" type, in contrast to the Blake gauge (see *Bird-Banding*, **25**: 11-16), which permits exact measurement of the leg in millimeters. It is much more useful to know the

exact size (for example, if 10% of the individuals seem to require a band size one size larger than that commonly in use, are they oversize by about .1 m, or is there an appreciable variation in size?). Certainly, any publishing recommendations on band size changes should specify whether they are based on the Michener-Bleitz gauge or on the Blake gauge.—E. Alexander Bergstrom.

8. The Point Pelee Bird-Banding Station: 1954-57. J. Woodford and W. J. Wasserfall. 1958. The Bulletin/Federation of Ontario Naturalists, No. 80, June, 1958. General description of the first four years of banding at Point Pelee, Ontario (Lake Erie), sponsored by the Federation of Ontario Naturalists. The first full-scale Heligoland trap in North America was built here, in 1954. Since 1955, mist nets have played an active part. Selected recoveries are listed. —E. Alexander Bergstrom.

9. A Discussion of Robin Banding. Geoffrey Gill. 1958. *Inland Bird-Banding News*, **30**: 41-42; 54. Results of the banding of 1,773 Robins *(Turdus migratorius)* at Huntington, Long Island, N. Y., from 1922 to 1957. Out of 140 nestlings banded, 3 were reported later: found dead in later years, 1½ to 2 miles from place of banding. Six birds were recovered in the southeastern U. S., in winter, as far west as Louisiana. The bulk of Robins banded at this station were taken in late summer and early fall in housetraps baited with water. —E. Alexander Bergstrom.

MIGRATION

10. Orientation of migratory restlessness in the White-crowned Sparrow. L. Richard Mewaldt and Richard G. Rose. 1960. *Science*, **131**(3393): 105-106. At night White-crowned Sparrows caged under open sky displayed predominantly southward activity in fall, predominantly northward activity in spring. By day they tended to do the opposite or to move at random. Orientation did not become clear-cut until two or three nights after the onset of migratory restlessness. Part-time screening of the portions of the sky near the horizon had no perceptible effect on performance, but rotation of the cage revealed some influence of interior points of reference. Under overcast skies, birds did not re-adjust for rotation as readily as otherwise.

Such are the findings of Mewaldt and Rose as given in a necessarily brief preliminary report on recent tests in California. The exact significance of their important work and its relation to the prior experiments conducted with Old-World Warblers by Sauer will not become apparent until the authors have fuller opportunity to explain what their method of measuring orientation means in terms of what the bird is actually doing. Sauer watched the birds to *see* in what direction they were aligning themselves; Mewaldt and Rose use automatic recording apparatus. The interiors of their circular cages are each fitted with an octagonal perching "ring." Every side of the polygon is hooked up to register the number of times the bird alights on it. However, according to Sauer, the orientation of a bird is not always closely correlated with its position on the perching ring. Birds frequently align themselves tangential to the ring and, when heading north, often perch on the south side, where they have the most extensive view of the sky. Thus, one cannot yet be sure that the two techniques would lead to essentially the same evaluation even if applied to the same set of movements.—R. J. Newman.

11. On the temporal pattern of nocturnal migration in thrushes. D. A. Vleugel. 1960. *Auk*, **77**(1): 10-18. Usually when the most migrants are seen crossing before the moon in this country, the fewest are heard, and vice versa. The Dutch ornithologist Vleugel now compounds this oddity by reminding us that the number of flight calls abroad tends to vary timewise as the number of lunar silhouettes does here. Though some of his cited references should have warned him otherwise, he apparently regards the typical American flight-call pattern—few sounds before midnight, a maximum at dawn—as a phenomenon peculiar to the Gaspé Peninsula, where Stanley C. Ball first systematically studied it. The fact is that observers at a number of places, watching the moon and listening simultaneously, have recorded aural evidence that directly contradicts their visual evidence. Gaspé-like flight-call maxima just before dawn have even been noted at sea.

As a result, Vleugel's attempt to explain the auditory data from the Gaspé as erroneous and purely local—as the result of selection of the wrong vantage point to detect an influx of thrushes over water from Anticosti Island—fails to penetrate to the heart of the general problem. An interesting sidelight stressed by Vleugel is that European radar observations by Sutter in Switzerland and Harper in Britain confirm our American hour-to-hour lunar pattern. To add to the confusion, however, American radar data from New England are rumored not to do so.—R. J. Newman.

12. Palearctic waders in eastern North America. Eugene Eisenmann. 1959. *British Birds*, **53**(3): 136-139. This 4-page communication is a commentary on certain aspects of I.C.T. Nisbet's *Wader migration in North America and its relation to transatlantic crossing*, reviewed in *Bird-Banding*, **31**(1): 45. In all three of these published items—commentary, original article, and review—the world "wader" is used in its British ornithological sense, *i.e.*, as synonymous with "shore bird," not as a term that either denotes or includes herons and their allies.

Eisenmann points out that only two Palearctic species of shore birds, the Curlew Sandpiper *(Erolia ferruginea)* and the Ruff *(Philomachus pugnax)* can be currently considered "of not infrequent occurrence" on the Atlantic coast of North America. Unlike other rare shorebirds, they are more in evidence there in spring than in autumn. To explain this odd seasonal distribution, Eisenmann further explores Nisbet's suggestion that the birds may have crossed the Atlantic during the previous autumn, at tropical latitudes. He reports that during the period when Palearctic birds are migrating southward to Africa southeast trade winds blow briskly and regularly south of the equator, while the zone just north of it is the breeding area of great cyclones that commonly travel westward toward the West Indies then curve northward along the North American coast. He points out that, as a result, even European birds arriving in the United States in autumn may have traversed the ocean at tropical latitudes. The astonishing number of Palearctic strays found on the little island of Barbados, easternmost of the Antilles, supports the idea of a tropical crossing. A complication not discussed is that weather patterns favoring Nisbet's suggestion of fall passage from Africa to America are unfavorable for his simultaneously postulated flight of American waders to Africa.—R. J. Newman.

13. The September Drift-Movements of 1956 and 1958. Kenneth Williamson. 1959. *British Birds*, **52**(10 & 11): 334-377. In the first week of September in 1956 and 1958 there were large drift movements mostly of night-migrating passerines of east European origin. The bulk of these southern and eastern rarities that normally migrate southeast in the autumn consisted of birds of the year. The author believes that the orientation mechanism may not mature until after a brief phase of random postjuvenile dispersion, as was found in the experiments by Perdeck (1958, *Ardea*, **46**) with Starlings *(Sturnus vulgaris)*. "In a season so markedly anticyclonic as 1958, the light easterly winds produced a drift-aided dispersal far to the west of the normal range."—M. M. Nice.

14. The Height of Bird Migration. David Lack. 1960. *British Birds*, **53**(1): 5-10. Through the courtesy of the R. A. F. Fighter Command Dr. Lack obtained information through radar on migration over Norfolk and over the North Sea off Norfolk by means of a much more powerful and accurate heightfinder than those previously in use. The common Passerine winter visitors were found to migrate for the most part below 5,000 feet. They usually fly higher in spring than in fall and higher at night than by day. Occasionally they were recorded at 14,000 feet and rarely as high as 21,000 feet. Waders, mostly Lapwings *(Vanellus vanellus)*, usually travelled between 3,000 and 6,000 feet; the highest echo was at 11,000 feet.—M. M. Nice.

15. A Study of the Vertical Distribution of Birds. Richard P. Riesz. 1958. *EBBA News*, **21**: 61-64. Study of the variation in height above ground during the day, of birds taken in nets at Island Beach, New Jersey in 1957. Statistical analysis of a sample of 85 birds indicated a greater average height early and late in the day, and lower near midday. The author does not comment on the possible effect of varying net visibility: in most net lanes, the upper part of the net tends to be in sunlight longer than the lower part (Island Beach has few

larger trees to provide shade in midday). As birds would tend to avoid the more visible part of the net, the vertical distribution of birds netted would be biased in the middle of the day. Under overcast conditions (such as prevailed during the period the author was at Island Beach), this bias would be lessened, but perhaps not eliminated.—E. Alexander Bergstrom.

16. A Meteorological Analysis of the 1958 Island Beach Netting Data. Gilbert S. Raynor. 1959. *EBBA News*, **22**: 73-81, 10 figs. This study should be compared with the general review of Operation Recovery in 1958, by Baird, Bagg, Nisbet and Robbins *(Bird-Banding*, **30**: 143-171). In particular, Raynor considers the correlation of migration in the fall with temperature drops not too good. The difficulty seems to lie in the flight of September 23, 1958, where he found no corresponding temperature drop. This seems to result from his use of 9 weather stations between Boston and Buffalo, at 7 P.M., as a base; while Baird *et al.* used the 1 A.M. figure for a much wider range of stations, including two in Canada and three in northern New England, indicating an average temperature drop of 6½ that night. Raynor continues to put more emphasis on stable air as a factor favoring migration.—E. Alexander Bergstrom.

18. The Autumn Migration of the Double-crested Cormorant Through Eastern New England. Ian C. T. Nisbet and James Baird. 1959. *Massachusetts Audubon*, **43**: 224-227. The route through the southern part of eastern New England seems very narrow. In general, it follows the coast. However, where the coast is not trending southwest, the birds depart from it: they cross the narrow neck of Cape Ann, and cross overland from Boston Bay to Narragansett Bay. The bulk of the flight continues over Block Island to Montauk Point, rather than following along the Connecticut coast. Birds seen far inland (such as those along the Connecticut River) are probably overland migrants from the St. Lawrence. Peaks of migrants appear to follow cold fronts.—E. Alexander Bergstrom.

POPULATION DYNAMICS
(See also Numbers 20, 31)

19. Bluebirds Suffer from Severe February Weather. Amelia R. Laskey. 1959. *Inland Bird-Banding News*, **30**: 57. After the cold, snowy weather of mid-February, 1958, some 40 dead emaciated Bluebirds were found in or near nest boxes in Warner Parks, Nashville, Tenn., including 12 in one box and 1 dead on the ground under it. The nesting population in the parks in the spring of 1958 was only about half that of 1957. During the season, 22 pairs fledged 146 young, 50.7% of the number of eggs laid (including second and third broods).—E. Alexander Bergstrom.

NIDIFICATION AND REPRODUCTION

20. Observations on the breeding behavior and nesting success of the Coot. (Några iakttagelser över häckningsbeteende och häckningsresultat hos sothönan *(Fulica atra).)* Torsten Askaner. 1959. *Vår Fågelvärld*, **18**: 285-310. (English summary.) The study was carried out during two nesting seasons in a moat and in a public park pond in southern Sweden. The Coots arrived before the ice vanished in the spring. Enlarging areas of open water released aggressive behavior. At first, this took the form of free-for-all battles. As the areas free of ice increased further, "balance" was achieved between the territorial contenders which, in turn, tended to establish the territorial borders. Posturing is described and illustrated by drawings. Most of the fighting was harmless, but once a female was knocked out for a few minutes when struck on the frontal shield. The territorial borders were not flexible as found in many other studies; the Coots displayed remarkable awareness of their exact locations. The proximity and the direction of movement of intruders in relation to the borders were paramount factors in the intensity of response of defending territory owners.

An "almost permanent" nest-building drive possessed the males and endured during the whole of the breeding season. In addition to the nest used, they constructed and kept in repair several other platforms. The females assisted by carrying material but did no building. Copulation took place on these platforms, or on the nest, or on land. Mating attempts in the water were unsuccessful. Both sexes incubated.

The nesting success in the moat differed greatly from that in the pond. Average hatching success in the first was about 39 percent against 60-87 percent in the pond. Of the chicks hatched in the moat only 15.4 to 19.0 percent survived to the age of 8 weeks, while this figure for the pond was 92.1 percent. One of the causes for this anomaly proved to be constricted territories, which engendered frequent fighting between the adults involving the safety of the chicks. Abundant food supplies, on the other hand, tended to cancel out this menace to their survival. The study shows ability in spotting and analyzing significant aspects of behavior, but positive recognition of individual birds through banding and marking would have made it more convincing.—Louise de K. Lawrence.

BEHAVIOR
(See also Numbers 20, 40)

21. Some Thoughts on "Appeasement" Displays. (Einige Gedanken über "Beschwichtigungsgebärden.") N. Tinbergen. 1959. *Zeitschrift für Tierpsychologie*, **16**(6): 651-665. (With English summary). "Agonistic displays have either a distance-increasing function (threat displays) or a distance-reducing effect; the latter category seems to inhibit the aggressive tendencies of other birds directly, and are therefore named 'appeasement displays' . . . Threat displays seem to be due to the simultaneous arousal of the tendencies to attack and to escape." Appeasement displays seem to be due to a conflict between the tendency to flee and that to approach or to stay. "Pair formation displays often form a sequence of one or two displays closely resembling threat displays, followed by a posture similar to an appeasement display." Sketches and photographs illustrate this interesting paper.—M. M. Nice.

22. Comparative Studies of the Behaviour of Gulls *(Laridae)*: a Progressive Report. N. Tinbergen. 1960. *Behaviour*, **15**(1-2): 1-70. A detailed, well-illustrated report of recent studies on 14 species of gulls with comparisons drawn from observations on other species. The topics covered are methods of study, description of the displays, causation and origin of the displays and "some evolutionary aspects." Under "Origin of the Displays" Dr. Tinbergen agrees with students of other species that "displays are 'derived' movements." In some cases their origin is obvious, in others it is not because "such derived movements have undergone ritualization, which I will define as adaptive evolutionary change in the direction of increased efficiency as a signal. . . . So far, two main sources of derived movements have been recognized. (1) Movements immediately evoked by the situation (such as fighting movements evoked by the approach of an intruder into the territory) are performed either incompletely (intention movements) or with another orientation (redirected movements). Such movements are often called 'autochthonous.' (2) Movements belonging to patterns other than those immediately evoked by the situation and which are therefore usually unexpected and functionally out of context or irrelevant." In other words, displacement activities.

This is a small sample of the wealth of thought-provoking ideas in this important contribution.—M. M. Nice.

23. Observations on the Fulmar in Spitzbergen. C. J. Pennycuick and D. Webbe. 1959. *British Birds*, **52**(10 & 11): 321-332. A colony of Atlantic Fulmars *(Fulmarus glacialis)* was watched from 23 July to 18 August 1957. Detailed descriptions of calls, displays, flight, and color phases are given, illustrated by 12 excellent photographs, mostly of birds in flight. As to ejection of oil, when "provoked a chick can perform the spitting movement and call as fast as 3 times per second."

"Quite apart from the deterrence of predators, this display is used by parents and chicks in aggression towards other Fulmars approaching their territory, and produces an immediate effect. Trespassing Fulmars would always retreat promptly from even a small chick spitting, whereas they would often ignore an adult cackling aggressively until it began to spit. Probably as a result of the extreme effectiveness of this display, the Fulmars hardly ever seemed to fight, and even the ejection of oil was infrequent." This peaceable behavior strongly contrasts with the continual fighting in the Guillemot *(Uria aalge)* colonies.

The young chick spits at anything that moves. The parent "alights a short

distance from it and approaches gradually, cackling every time the chick spits and thus eventually appeases the latter's aggressive behaviour." The chick gives its begging note and the parent begins to regurgitate and passes the food to its offspring.—M. M. Nice.

24. Notes on Anting by British Passerine Birds in the Wild. Introduced by K. E. L. Simmons. 1960. *British Birds*, **53**(1): 11-25. After a brief review of some recent studies on anting and description of some of his own experiments, Mr. Simmons comments on the notes on this subject by 14 authors. Five of these concern Blackbirds *(Turdus merula)* and 10 concern Starlings *(Sturnus vulgaris)*. Birds seem "particularly likely to ant at the times of the ants' reproductive swarming." One record proves to be the first for the Paridae—F. E. Muddeman's description of this behavior in four *Parus caeruleus* ("Anting by Blue Tits," p. 17.) —M. M. Nice.

25. Observations on Blue-breasted Waxbills. Derek Goodwin. 1959. *Avicultural Magazine*, **65**(6): 149-169. A delightful account of two pairs of *Uraeginthus angolensis* in captivity, illustrated with sketches of many of the displays. Mutual preening appears to involve "*sublimated* aggressive tendencies on the part of the preener and of submissiveness on the part of the preenee." In courtship the male may assume the "Submissive Courtship or Wing-fluttering Display," interspersed with the self-assertive "Tail-twist Posture," as well as the Stem Display. In this the male seizes a long stem of grass, perches alongside the hen, twists his blue tail towards her and bounces up and down, singing and holding the stem.

Both sexes build, incubate, brood and feed the young; in later stages the male's interest outlasts that of his mate. Voice is discussed in detail. Song as in other estrildines seems to be mainly sexual in character with no threatening or territorial meaning. "Often the song appears to be little more than an expression of general well-being." The young Blue-breasts sang a great deal. "It seemed as if the young birds were trying out every possible sound they were capable of uttering. . . . Both male and female juveniles sang but before the young males had attained adult plumage and their warbling had 'crystallized out' into the adult song their sisters had ceased to sing." Many comparisons are made with the behavior of other waxbills.—M. M. Nice.

CONSERVATION
(See also Number 45)

26. Can Oil Pollution Be Defeated? John V. Dennis. 1959. *Massachusetts Audubon*, **44**: 66-73. A general discussion of sources of oil pollution, and of losses to seabirds from this source. Included is a list of procedures for the care of individual oiled birds, such as the use of Fuller's Earth on the feathers to remove oil.—E. Alexander Bergstrom.

WILDLIFE MANAGEMENT
(See also Numbers 31, 42)

27. Some Effects of a Field Application of Dieldrin on Wildlife. Thomas G. Scott, Yuell L. Willis, and Jack A. Ellis. 1959. *Journal of Wildlife Management*, **23**(4): 409-427. Severe losses to birds and other wildlife resulted from a field application of dieldrin at the rate of 3 pounds per acre. Resident populations of Meadowlarks *(Sturnella magna)*, Robins *(Turdus migratorius)*, Brown Thrashers *(Toxostoma rufum)*, Starlings *(Sturnus vulgaris)*, Common Grackles *(Quiscalus quiscula)*, and Ring-necked Pheasants *(Phasianus colchicus)* were almost eliminated. Horned Larks *(Eremophila alpestris)* suffered heavy losses, and many other species of birds were found dead. Although most of the mortality occurred during the week following application, bird populations remained low in the area throughout the spring and early summer. The low breeding bird population was attributed in part to the shortage of insects as food. The authors believe that the high mobility and productivity of wildlife populations would probably result in the recovery of most species on the treated area within the year following application of dieldrin.—F. C. Bellrose.

28. Insecticides and Birds. George J. Wallace. 1959. *Audubon Magazine*, **61**: 10-12, 35. Description of population declines of Robins *(Turdus migratorius)* from 1954 through 1958, at East Lansing, Michigan. In the summer of 1954, the nesting population on one tract of 185 acres was at least 185 pairs. In 1957, only 15 adults were found; in 1958, only 3 adults. In addition, fledglings were almost entirely absent.

The tract had been heavily sprayed with DDT to control elm bark beetles. Apparently the Robin mortality resulted from eating earthworms, as the worms concentrate the insecticide by feeding on leaf litter. Some other species were affected by the earthworms, and others by feeding on poisoned leaf insects. Over a period of 16 years, Wallace's records for East Lansing show that 49 out of 77 summer residents have disappeared or decreased in numbers; the majority of the species which decreased are known to have suffered from insecticides.—E. Alexander Bergstrom.

29. Another Year of Robin Losses on a University Campus. George J. Wallace. 1960. *Audubon Magazine*, **62**: 66-69. This supplements No. 28 above. An influx of Robins *(Turdus migratorius)* on the North Campus of Michigan State University, at East Lansing, Mich., resulted in a population slightly above the very low 1958 count. At least 55 birds were picked up dead; an analysis showed that all but one contained DDT, most of them in high concentrations (Wallace, personal communication). In effect, the entire population that started to nest was wiped out, plus one or more replacement groups. The campus drained off Robins from a much larger area. The fact that the campus had a few Robins tended to conceal the extent of the mortality. In contrast to fall kill of game birds, this mortality came at the time of year when it had the worst effect on reproductive success.

The campus has a general lack of insectivorous birds, despite attractive plantings. In contrast, birds such as Common Grackles and English Sparrows have increased.—E. Alexander Bergstrom.

30. The Pesticide Problem/Wildlife—The Community of Living Things. John L. George. 1960. *Massachusetts Audubon*, **44**: 226-232. General review, with bibliography of 38 titles. In addition to the Michigan studies (see Nos. 28 and 29 above), Robins in Wisconsin were very hard hit in areas sprayed with DDT, being reduced to about 2% of normal in the most heavily sprayed areas. The use of DDT to control the spruce budworm caused heavy losses of Atlantic salmon in the Miramichi River in New Brunswick. At Clear Lake, California, use of DDT led to heavy mortality of Western Grebes, largely by eating predaceous species of fish that had concentrated the chemical.—E. Alexander Bergstrom.

31. Migration and Mortality of Hand-Reared Redheads *(Aythya americana)*. Milton W. Weller and Peter Ward. 1959. *Journal of Wildlife Management*, **23**(4): 427-433. Band recoveries from hand-reared Redheads were compared with those from wild birds for migration and mortality differences. Hand-reared Redheads were released at the Delta Marsh, Manitoba; others were shipped to the LaCreek National Wildlife Refuge, South Dakota and to the Seney National Wildlife Refuge, Michigan. Migratory movements of hand-reared and wild Redheads from the Delta Marsh were similar, but the hand-reared birds left the release site later and migrated more slowly. Hens of hand-reared Redheads homed back to the LaCreek and Seney refuges, but no increase occurred at either refuge in the breeding population as a result of the releases.—F. C. Bellrose.

32. Mourning Dove Production in Four Idaho Orchards and Some Possible Implications. Edson Fichter. 1959. *Journal of Wildlife Management*, **23**(4): 438-447. A brief account of the nesting success of 100 pairs of Mourning Doves *(Zenaidura macroura)* in southeastern Idaho compared with the nesting success of this species elsewhere in the United States. There were 266 nesting attempts, of which 177 were successful. Of 510 eggs laid, 385 hatched and 324 young left the nests. The causes of egg and nestling losses were obscure. A review of many nesting studies shows that the percent of egg loss is twice as great as that of nestlings.—F. C. Bellrose.

33. Blue Grouse Production, Movements, and Populations in the Bridger Mountains, Montana. Thomas W. Mussehl. 1960. *Journal of Wildlife Management*, **24**(1): 60-68. Male Blue Grouse *(Dendragapus obscurus)* were observed displaying, largely in April and May, at elevations of 5,600 to 6,700 feet, in the montane forest. Three nests were found in bunchgrass prairie, 200 yards to over 1 mile from the montane forest. Hatching dates, derived from ages of juveniles, were between 25 May and 14 July. Homing was indicated by the finding of an adult male 1 year later about ¼ mile from the place it was banded as a chick. A female, also banded as a chick, was found nearly 1 year later in the same clump of brush. Marked broods moved within an area of about ½ mile on the summer range. Dispersal from the summer range became apparent in August, and by mid-September the upward altitudinal migration was well underway. Lateral movements up to 2.1 miles and altitudinal movements up to 3.4 miles were recorded.—F. C. Bellrose.

PHYSIOLOGY AND PSYCHOLOGY

34. Two Conditions Limiting Critical Age for Imprinting. Eckhard H. Hess. 1959. *Journal of Comparative and Physiological Psychology*, **52**(5): 515-518. Experiments on 137 White Rock chicks from hatching to the age of 36 hours showed the presence of fear in no chicks from 0 - 12 hours, in 10 percent at 13 - 16 hours, and from then on a rapid increase to 80 percent at 25 - 28 hours and 100 percent at 33-36 hours. Experiments on speed of locomotion of 60 chicks showed a steady increase up to the 16th hour. Dr. Hess concludes that the critical age for imprinting occurs after the establishment of locomotion and before the onset of fear.—M. M. Nice.

35. An Experiment on Emphatic Learning in Ducks. Peter H. Klopfer. 1957. *American Naturalist*, **91**(856): 61-63. A Muscovy Duck *(Cairina moschata)* learned to avoid an electrically wired food dish from observing the behavior of two other Muscovies tested with the apparatus, and the same was true with a number of Mallards *(Anas platyrhynchos)* that watched other Mallards coming into contact with the dishes. Such social facilitation in learning has often been observed with Crows *(Corvus brachyrhynchos)* that quickly shun a source of food after several of their companions have succumbed to poison. —M. M. Nice.

MORPHOLOGY AND ANATOMY

36. Bill length and body weight in Herring Gulls and Greater and Lesser Black-backed Gulls. Report No. 50 from the State Veterinary Institute, Stockholm, Sweden. (Näbblängd och kroppsvikt hos gråtrut *(Larus argentatus)*, havstrut *(L. marinus)* och silltrut *(L. fuscus).)* Karl Borg. 1959. *Vår Fågelvärld*, **18**: 311-317. (English summary.) During the population control work with chlorals on the Swedish west coast in 1957 and 1958, a number of anaesthetized gulls were obtained for measuring and weighing. Methods and calculations are given and results summarized in tables and graphs. The difference found between male and female bill lengths and body weights was statistically "highly significant" in all three species. As could be expected in proportionately developed birds, a correlation existed between the bill lengths and body weights in the Herring Gulls.—Louise de K. Lawrence.

PLUMAGES AND MOLTS

37. Identification of Immature Cuckoos. Joseph R. Jehl, Jr. 1959. *EBBA News*, **22**: 102-103. Comparison of the immature Yellow-billed and Black-billed Cuckoos in the hand, by several points: (1) bill (basal half of lower mandible tends to be light, generally yellowish in y-b and bluish in b-b; (2) wings (rufous duller in b-b); (3) eyering (pale lemon yellow in y-b, deep chrome yellow in b-b); (4) underparts (usually grayish in y-b; usually with buffy tinge in b-b); (5) tail (in y-b, outer retrices broadly tipped with white central retrices dark to tip; in b-b, all retrices narrowly tipped with white, which may wear off infrequently); (6) back (warm brown in y-b; brown with olive gloss, and feathers often tipped with white, in the b-b).

We need more such studies, of other species readily confused, by banders with an opportunity to handle both species regularly. This comparison illustrates the many rewards of banding in Operation Recovery quite apart from actual recoveries.—E. Alexander Bergstrom.

ZOOGEOGRAPHY
(See also Numbers 1, 5, 6, 9)

38. Habitat requirements of the Wood Warbler in northeastern Östergötland, central Sweden. (Grönsångarens *(Phylloscopus sibilatrix)* häckningsterräng i nordöstra Östergötland.) Germund Tyler. 1959. *Vår Fågelvärld*, **18:** 279-285. (English summary.) This investigation was undertaken during one breeding season and included 100 Wood Warbler territories. The species showed a preference for mixed woods, with birch *(Betula alba)* predominating and a moderate to dense underbrush, for marginal situations along roads, fields, or shores, and for slopes with southern exposure.—Louise de K. Lawrence.

39. The Evening Grosbeak Returns to Northeastern Ohio. Ralph W. Dexter. 1959. *Inland Bird-Banding News*, **31:** 4-5. Description of the flight from December, 1957 through May, 1958.—E. Alexander Bergstrom.

FOOD

40. Feeding Behaviour of Choughs. Brian C. Turner. 1959. *British Birds*, **52**(10 & 11): 388-390. Notes on three captive *Pyrrhocorax pyrrhocorax*. After feeding on fly pupae, the birds regularly regurgitate some—still whole—and bury them in cracks between the bricks of the floor, after which the birds place 2 to 3 small stones on top. Later they dig them up and either eat them, replace them, or bury them elsewhere. Extra mealworms are not swallowed but carried in the bill to be buried.—M. M. Nice.

41. The Food of Nestling Rooks near Oxford. J. D. Lockie. 1959. *British Birds*, **52**(10 & 11): 332-334. By placing collars around the necks of young *Corvus frugilegus* at intervals during their first 3 weeks of life, food was collected in 36 samples from 4 rookeries in 1952 and 47 samples from 2 rookeries the following year. "Earthworms formed the bulk of the food in all rookeries in each year except rookery A in 1953." In 1953 April was cold and dry and the percentage of grain fed was much higher than it had been in 1952. "The percentage survival of broods of 5 in 1953 was 55% whereas in 1952 it was 69% (Lockie, 1955)."—M. M. Nice.

BOOKS

42. Wildlife of Mexico. The game birds and mammals. A. Starker Leopold. 1959. Berkeley and Los Angeles. Univ. California Press. 568 pp., 194 text-fig., 2 colored plates, map. Price $12.50.

The first attempt to treat the game animals of Mexico from a biological standpoint will be of interest to both hunters and conservationists. An introductory section deals with the environment, land use, wildlife utilization, and existing and proposed conservation methods. The bulk of the book treats the game animals, which are defined to include 71 species of birds and 49 mammals. Under each species is given a brief description, its range, natural history notes, and status as a game animal. Appendices include the Mexican game laws and an 8-page bibliography.

Field work financed by the Mexican government took place in 1944 and 1945, and shorter excursions under the auspices of the University of California helped fill some of the gaps in the original survey. An itinerary or even a list of the localities visited would have been useful, but a spot map (fig. 1) of the author's travels enables one to evaluate the coverage of the country. Fifty-one stations, mostly unidentified, are shown on the map, the number per state or territory varying from 6 (Chihuahua and Guerrero) to none (Aguascalientes, Colima, Quintana Roo, Tlaxcala, and Zacatecas), for an average of 1.8 camps per state. With a week's average stay at a camp, the data for each state were assembled in about 12½ days' field work. In a country so large and varied, with

such diverse environment and fauna, it is obvious that the conclusions are based on a minimum of data.

The book is profusely illustrated. The 32 photographs of habitats are especially useful, since the descriptions of the vegetational types are overly brief and non-definitive. The photographs by Charles W. Schwartz are superb. Others vary from excellent to poor. In the systematic account, 106 full pages are devoted to illustrations of individual species. These include lithographic crayon drawings by Schwartz, often with detailed inserts, and more or less accurate distributional maps. The medium seems to work well for mammals, but the bird drawings lack feather feel. Eighteen photographs of successful sportsmen with their victims strung up like Mussolini become a little too repetitious for even a hardened bird-killer. Perhaps more care could have been used in editing the illustrations; everyone knows what airplanes and oxcarts look like, and although a rarer sight, it is easy to imagine three laborers digging postholes.

Errors of fact or proofreading are relatively few in this pioneering work. I hope the book will find a wide audience, particularly in its planned Spanish language edition, and that it will be successful in furthering the badly needed conservation of natural resources in Latin America.—Pierce Brodkorb.

43. The Wandering Albatross. William Jameson. 1959. William Morrow and Company, New York, 128 pp. illustrated. Price $3.00. Here is one of those rarities that the conscientious and critical reviewer encounters all too seldom, a work that merits unstinted praise. Admiral Jameson (RN, ret.) first met the subject of this delightful monograph while cruising southern seas on the *Ark Royal* in her long but successful search for the Graf Spee in 1939. He writes of this greatest of all seabirds, which he has studied ever since, in delightfully informal fashion as only a sensitive and observing mariner with a rare gift of expression could. Frequent nautical references and terms enliven the account and give it proper tone: an albatross seen from the ship "well to leeward may not close her if the wind is strong." Another "turns down wind across the wake, 'reefs' its wings into a shallow W and dives rapidly to leeward."

The author presents in entertaining and easily assimilable form all the essential information that the average reader will want to know about the Wandering Albatross. Two features of the book are outstanding. The first is Jameson's lucid and simple description of the mechanics of albatross flight. His exposition on dynamic soaring is far and away the clearest I have yet encountered. The second is the Admiral's thorough search into the folklore, which for the albatross is of course primarily sailor's lore. He destroys, I sincerely hope for good and all, the ridiculous fantasy foisted on the English-speaking world by Coleridge that sailors believe it bad luck to kill an albatross. "There is certainly no evidence that sailors have the slightest compunction in killing an albatross," to which I would add, "or ever have had." The only ones who believe the superstition are those who have had Coleridge's "Rime" instilled into them at an early age. Such were non-existent before the mast in sailing ship days and are rare in modern ships even in officer's country. Nevertheless I have encountered the belief in otherwise quite sane and unsuperstitious naval officers, and it has several times interfered with my attempts to collect albatrosses.

The four-page bibliography lists most of the standard ornithological sources, and a number of 18th and early 19th century traveler's accounts that have largely been overlooked. It is of course not exhaustive, and is weakest in references to recent periodical literature, particularly on current banding activities, though all the classic and a few of the outstanding recent recoveries are cited. After all, there is a limit to the amount of technical detail you can include in a popular book, and this one gives an amazing amount of it with very few and minor inaccuracies. My only serious criticism of the book is that it is too short. I enjoyed every word of it so much I was sorry when I finished it that there was no more. —O. L. Austin, Jr.

44. Our birds of the Northland. (Våra fåglar i Norden.) Kai Curry-Lindahl. 1959. *Natur och Kultur*, Stockholm, Vol. 1, pp. 557, plates I-LXXXV. In Sweden the emphasis placed on good reference books of a scientific-popular nature in order to promote common knowledge of birds and their lives is clearly shown by the fact that in the past 10-15 years three major ornithological works of this type have been published. The present book is a second edition of the

first volume, ably edited and brought up to date by Kai Curry-Lindahl in collaboration with many of Scandinavia's foremost ornithologists. Of the two prefacing chapters, one written by Gustaf Rudbeck is a needed orientation on the work currently being done on migration as well as an apt evaluation of the various theories existing today. Suggested is a wider organization of cooperative effort in observations and experimentations—not in the laboratory—but in the field, in an attempt to overcome the discrepancies that now exist between these theories and the "facts of observation."

The annotated section is arranged according to Wetmore's system. It includes those species of the Orders Gaviiformes through Falconiformes which occur in Sweden regularly every year. Generous space is accorded each species, usually with one colored plate of a museum specimen set up to advantage in its milieu as well as a rich assortment of black and white photographs of live birds, depicting posturing and behavior situations, nests, young, and habitat. The description of the Golden Eagle *(Aquila chrysaëtos chrysaëtos)*, for example, contains a remarkable piece of good writing on the finding of a nest in the Lapland wilderness, accounts of the hunting technique of this large predator illustrated by a series of photographs showing the killing of a fox, a detailed narrative of two days' watch at a nest, the activities of the parents and the feeding of the young eaglets. The description of plumages is complete for all ages in most species; the occurrence records often contain year to year histories of individuals or nests; in the breeding sections the data on egg-laying, incubation periods, and the participation of the sexes, are, in the majority of the cases, substantiated by evidence. Migration, the protection of raptors, hybridization, conclude these highly informative chapters.

Of special interest to the North American ornithologist is the chapter on the Canada Goose *(Branta canadensis canadensis)*. This bird was introduced during the 1930s and 1940s, thrived and extended its range into central and northern Sweden. The Swedish Canada Goose enjoys complete all-year protection, migrates southwards for rather short distances, winters inland on open streams and rivers or along the sea shores as far south as the German North Sea coasts. Hybridization has occurred with five other species of geese, with the Mallard *(Anas platyrhynchos)*, and the Mute Swan *(Cygnus olor)*. The work is in 12" x 8" format and I have searched in vain for a typographical mistake. It is indeed a luxury model of consistent excellence.—Louise de K. Lawrence.

45. Securing Open Space For Urban America: Conservation Easements. William H. Whyte, Jr. 1959. Technical Bulletin 36, Urban Land Institute (1200 18th St., N.W., Washington 6, D.C.) $3.00. While the importance of habitat preservation for wildlife conservation has received increasing emphasis, most studies cover the selection of areas best suited for wildlife, or the improvement of such areas by management once they have been acquired.

This monograph is the full, technical expression of an idea described by Whyte in *Life* (issue of August 17, 1959). This in turn was an expansion of a discussion by Whyte in a chapter of *The Exploding Metropolis* (by the editors of *Fortune*, 1958, paperback edition by Doubleday Anchor Books, 95¢). It spells out in detail the legal precedents and problems, with specific case citations, and eight appendices with state or federal statutes or easement agreements.

Whyte stresses the view that "open space must be sought as a positive *benefit*. Open space is not the absence of something harmful; it is a public benefit in its own right, now, and should be primarily justified on this basis."

The ability of a government agency, or of private groups, to preserve desirable areas by outright purchase is quite limited compared to the need for such preservation. In many cases, purchase of only part of the owner's rights is much less expensive than purchase in fee simple, and accomplishes as much. In farm land, for example, the agency may purchase an easement under which the landowner (and his successors) may not construct a building or cut trees or shrubs, yet he retains full use of the land for normal farming purposes.

All too often, inability to finance acquisition of the land prevents any real progress. The temptation is to consider the land only from the standpoint of wildlife management, and to regard other possible uses as simply interference. While obviously not all possible uses are compatible, many tracts can effectively serve several purposes: for example, wildlife management, flood control, and the preservation of "open space" as a matter of sound regional planning. This combination of purposes may justify immediate action, and may justify preservation

of many areas where no single reason was compelling in itself. Even where a purpose such as flood control does warrant immediate action, a little imagination will often make it possible to accomplish a secondary purpose—such as preservation and improvement of wildlife habitat—very economically. These ideas are not entirely new, but many of the best examples of successful multiple use of land are not widely known among those whose interest is primarily wildlife conservation. This is the best general discussion I have seen on what the problem is and how to go about putting the ideas into practice.—E. Alexander Bergstrom.

NOTES AND NEWS

At the field meeting of NEBBA held on June 4, 1960 (at Arcadia Wildlife Sanctuary, near Northampton, Mass.), the Council reviewed the third draft of the proposed by-laws for NEBBA as a corporation, and recommended that the Association incorporate, and adopt these by-laws. The recommendations will be voted upon at the annual meeting, October 1.

The ten-year index to *Bird-Banding* for the years 1941 through 1950 will be ready this fall. It runs to some 256 pages, inasmuch as the reviews are indexed in detail; thus it can serve as a brief index to general ornithological literature of that decade as well as to papers and notes published in *Bird-Banding*. Copies are being sent without further charge to: (1) life members of NEBBA; (2) current exchanges; and (3) those who have contributed to the Index Fund over the past 10 or 12 years (this includes a number of copies to IBBA, in recognition of their generous support of the index). Present members or subscribers may purchase copies at $3.00 (paperbound) or $4.00 (hard covers), postpaid within the U.S. or Canada; the price to others will be $4.00 (paperbound) or $5.00 (hard covers). Orders should be sent to the Treasurer, Mrs. Downs.

Mrs. Downs can also furnish lists of back issues of *Bird-Banding* in stock (at $1.25 per issue).

For prices and other information on the five types of mist net sold by NEBBA, inquire of Mr. E. A. Bergstrom, 37 Old Brook Road, West Hartford 17, Conn.

The Bird-Banding Office at Patuxent is planning an experiment on band legend, to compare the reporting rate of the present bands with one having no indication that a Federal agency is involved ("write P.O. Box 66, Bowie, Md., U.S.A."). The species in this test will be the Red-winged Blackbird, Common (= Bronzed or Purple of the 4th A.O.U. checklist) Grackle and Starling. Any bander who would like to take part, and who has reasonable expectations of banding 100 or more of any one of these species by December 31, 1961, should write to Dr. A. J. Duvall, Patuxent Wildlife Research Center, Laurel, Md. Only flying (non-nestling) birds will be used. The experimental bands (string of 50) will be used alternately with standard bands (string of 50 supplied by Patuxent specifically for this test) as controls. We hope that this test can be conducted on a sizeable scale, as any improvment in the reporting rate of bands would make our efforts as banders more effective.

Dr. Paul Bartsch died at the age of 89 on April 24, 1960. He did the first important scientific banding work in America, having banded, during 1901 and 1903, a total of 101 young Black-crowned Night Herons at two colonies in the District of Columbia. The bands were labelled "Return to Smithsonian," plus year, and a serial number. The results of this work were published in *Smithsonian Misc. Colls.*, **45**(1-2): 104-111 (Dec. 9, 1903). See also, *A Note on the First Bird-Banding in America*, by Dr. Bartsch, in *Bird-Banding*, **23**: 59-60, April, 1952.

A conference on the potential role of birds in the epidemiology of certain viruses affecting man was held at the National Institutes of Health on April 4, 1960. The purpose was to bring ornithologists and virologists together in a joint effort to suggest solutions for these problems. A result of the discussions was recognition that many ornithological aspects need more research. For example, dates of arrival and of departure, numbers of migrants, distribution in South America and in southern United States, and also several physiological aspects

are important problems that ornithologists might explore in more detail. The Public Health Service supports basic research that often has intrinsic ornithological value. Information about applications for grants may be obtained from: Research Grants Division, U. S. Public Health Service, Bethesda 14, Maryland. The ornithologists present at the conference were David E. Davis, Pennsylvania State University, University Park, Pennsylvania, Mr. Allan Duvall, Patuxent Research Refuge, Laurel, Maryland, Mr. William H. Gunn, Ontario Society of Naturalists, Toronto, Canada, and Dr. Herbert Friedman, U. S. National Museum, Washington 25, D. C.

BIRD-BANDING

A JOURNAL OF ORNITHOLOGICAL INVESTIGATION

Published quarterly for:

THE NORTHEASTERN BIRD-BANDING ASSOCIATION
THE EASTERN BIRD-BANDING ASSOCIATION
THE INLAND BIRD-BANDING ASSOCIATION

Applications for membership in these associations should be sent to their respective secretaries. The annual membership dues of $5 per year ($7 family membership, for adults) in the Northeastern Association include a subscription to *Bird-Banding*. Membership in the Eastern and Inland Associations is $2 each per year; members of those associations who wish to receive *Bird-Banding* may send $4 direct to the secretary-treasurer. Subscription price to non-members of the associations is $5 per year; single copy $1.25.

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